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East Europe Report

SCIENCE AND TECHNOLOGY

CZECHOSLOVAKIA: SELECTIONS FROM ORGANIZATIONAL AND COMPUTER TECHNOLOGY

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CZECHOSLOVAKIA: SELECTIONS FROM ORGANIZATIONAL AND COMPUTER TECHNOLOGY

VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY, No. 1, 1984

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SELECTIONS FROM ORGANIZATIONAL AND COMPUTER TECHNOLOGY

Technical Production Preparation Subsystem

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 3-16

[Article by Eng Jaroslav David, Office Machines, Prague: "TPV/VARS Subsystem for Technical Preparation of Production"]

[Text] 1. Subsystem Characteristics

The role and application of the TPV/VARS [technical preparation of production/ multilevel automated control system] subsystem is based on technical production preparation activities in an enterprise.

The area of technical preparation of production in an enterprise encompasses a vast extent of creative and routine activities in research, development, in gaining profficiency in turning out new products, use of new technologies, and in modernization of the existing production program. The focal point of TPV efforts lies primarily in creative efforts in which decisions are made about the technical specifications and functional properties of new products, about the technology of their production, including determination of labor value added and past labor input and, thus, about the costs and profitability of their production.

The product of these creative efforts is basic technical documentation which contains information about products, material input into production, production technology, and the production means used in the production process.

Routine TPV activities include primarily compilation, maintenance and distribution of technical documentation, processing of documentation of a technical and economic nature, such as THN [technoeconomic norms], calculations and documentation for price setting.

The objective of TPV automation is the transfer of routine administrative operations to a computer and in so doing to make the capacity of designers and technologists available for creative work on a product and its technological preparation for production.

Technical preparation of production is the key source of information for planning, control and implementation of the production process. The generated information is relatively constant with mutual, sometimes very complicated interrelations. Every change in the TPV information base must be reflected in all its relationships and linkages. Setting up an automated system for TPV management is not just a local matter concerning the subsystem itself.

The TPV VARS system is applicational software that can prove to be an effective tool in the generation of an automated TPV system, if the ASR [automated system of management] of TPV approaches it creatively.

ASR TPV must be seen as a goal-oriented solution of complex problems in TPV activities with the use of computer technology.

The TPV VARS subsystem is based on information contained in technical documentation and provides within the VARS system for the generation, maintenance and utilization of the widest data base of an engineering enterprise, i.e., technological design information.

The data base of the TPV VARS subsystem includes:

--primary data for all products, assemblies, subassemblies, parts, processes and raw materials entering the production process and their mutual structural linkages;

--data regarding all operations in technological processes, their descriptions as well as information about special tools and preparations required for performance of the requisite operations;

--comprehensive norms and normatives computed from the basic data of the TPV data base.

The TPV VARS data base not only serves the subsystem itself, but is an indispensable source of information, particularly for the subsystems ORV [organization of production], MTZ [supply operations], ODBYT [marketing] and TEP [technoeconomical planning]. From this aspect the TPV subsystem constitutes the key subsystem of the VARS system.

2. Subsystem Data Base

The TPV VARS subsystem's data base is a part of the integrated information system of VARS based on data bank processing of information with the aid of the DBS-25 data bank system.

From the viewpoint of data generation, the TPV VARS data base contains the following information:

--Basic, provided and updated by the user. Basic information is obtained by "acquisition" from basic design and technological documentation.

--Combined information obtained through computation of basic information. The requisite computations are carried out by programs of the TPV VARS subsystem.

The entire data base of the TPV VARS subsystem is stored in data base items.

Basic data elements are stored in segments:

--ZDPOL--Basic Data of Items

A segment contains basic data about all items produced and procured by the engineering enterprise. Data about produced items are supplied into the segment by the TPV subsystem and about procured items (Price List of Materials) by the MTZ subsystem. In addition to the preceding information, the ODBYT subsystem supplies both types of segments with marketing data. The TPV VARS subsystem provides for programmed establishment and updating of both types of occurrences and of marketing data. The subsystem responsible for formal and actual correctness of procured items and of marketing data are MTZ and ODBYT.

--KUSOV--Parts List Linkages

The information stored in this segment concerns the relation between a higher and lower item in the structure of products and the amount by which the lower item enters into the higher item. In addition to the magnitude of this amount the segment KUSOV covers the occurrence of other data as well. With the aid of these two segments breakdowns of product structure, including inverse breakdowns, are accomplished.

--TEOPE--Technological Operations

The segment contains information about the technological norms of operations carried out in the plant and in joint operations, centers and work facilities where the operations are carried out, about wage classes into which they are classified.

--NAROP--Operational Implements

The segment contains information about preparations and special tools required for the performance of individual operations in technological processes.

--TEXTY--Description of Technological Operation

The segment contains detailed instruction (job description) for operations in technological processes.

--NAPRA--Substitute Work Facilities

The segment contains identification of centers and work facilities at which any given operation of the technological process can be performed under conditions identical to those listed for the operation.

Computed data elements are stored in segments:

--NORMY--Comprehensive THN of Materials and Outputs

These segments are generated for all produced items stored in the ZDPOL segment with established technological process operations and parts list linkages. They contain computed data on:

--comprehensive material norms,
--comprehensive output norms,
--production calculations computed in accordance with a calculation formula.

These computed values are of longer validity and, therefore, during updating of basic information which leads to changes in THN, updating is done by generating new, updated values for identical items with a new term of validity. The old value is left in the segment and the user has the option of cancelling it at any time.

--SOKUS--Comprehensive Parts List

This segment contains information about comprehensive parts lists of final products or important assemblies, i.e., the magnitude of quantities by which each item of the structure enters into the processed final product.

--TEOPE--Technological Operations

In addition to basic data (see the section on Basic Data Elements), this segment also contains computed information of the interoperational price list.

--NPRAC--Work Point Norms

The segment contains for all final products or assemblies stored in the SOKUS segment data about all centers and work facilities which participate in production of a given final product. For each center and work facility are listed labor costs, outputs, average wage class and the average wage rate. This segment is generated in the second stage of establishment of the TPV VARS system.

--ZDPOL--Basic Data and Items

Produced items contained in the ZDPOL segment are supplemented by computed values of the time needed for production and values of technological (disposition) steps. In the second stage of setting up of the system the segment will be supplemented by computed values of technological batches of production.

Automated updating of all computed information is done on the basis of changes in basic data elements. During updating of these basic data, the TPV VARS updating programs identify how the posted change will affect the computed information. With the aid of this identification the updating programs perform recomputation of combined (computed) information.

The TPV VARS data base was generated in cooperation with the enterprises in which it was verified so as to meet the demands of all types of production. With the aid of the programming apparatus of the VARS system the user can select from among the offered data elements only those he wants to use, and cut down the length of the selected data elements. In so doing he generates a data base which meets his requirements. If he abides by the specified conventions, the user need not make any modifications in the subsystem's programs. In a case where he would add a data element other than specified in the lists, he must also carry out the requisite modifications in the programs by himself.

In the second version of the subsystem the users can store in the KUSOV and TEOPE segments positions or operations of the technological procedure for the same identifications with different validity deadlines. This enables the users to carry out updating of these segments with a lead in time at a point when it is known that a change will be implemented as of a given deadline.

For the validity deadlines of operations in technological procedures and of parts list positions, the relevant segments contain the data elements OD [from] and DO [to] which denote when it is valid and until what deadline. In establishing a deadlined segment for a technological operation or a parts list linkage, the user supplements the datum OD and the relevant TPV VARS programs will automatically terminate in the DO field the validity of the preceding deadline.

If the user wants to avail himeself of the opportunity for supplementing valid deadlines, then in processing every output he must inform the relevant programs with the aid of parametric punch cards of the date as of which he wants it processed.

3. Subsystem Program Concept

Functioning of the TPV VARS subsystem is taken care of by software formed by three relatively independent parts:

--preprocessing of initial and updating data,
--TPV VARS subsystem's own software,
  --storage and updating programs,
  --TPV VARS user programs,
--printout of output reports.

Preprocessing of initial and updating data in the VARS system is provided by all-purpose programs which perform data conversion, formal and logic control of data elements and reformatting of sentences into the desired configuration.

Preprocessing of initial and updating data can be carried out by random hardware or systems, provided that the user adheres to the prescribed sentence format for generating or updating segments of the TPV data base. This makes software relatively independent of the method of preprocessing of data. All user output compilations are generated by the user himself with

the aid of the all-purpose P03009 printout program. This program can be used to generate output compilations directly from segments of the data base, or from sets which were preprocessed for printing by TPV VARS programs.

All TPV VARS subsystem programs are written in ASSEMBLER with maximum use of macrolanguage. The used macra substantially speed up programming and are either general, prescribed for the entire system, or confined to the subsystem.

4. Subsystem's Breakdown

Breakdown of the TPV VARS subsystem is undertaken in keeping with the Organizational Type Catalogue of ASR Elements generated in the ASDAT system.

This breakdown makes it possible to design ASR elements as a modular system from which the user puts together any random higher system depending on his specific individual needs. However, he must maintain the requisite linkages within the subsystem as well as to the other subsystems he wants to use.

--ASU131 TPV Planning

No special software is currently generated for this area. It is envisioned to use the method of network graphs.

--ASU132 Structural Preparation of Production
  --AUL1324 Processing of parts lists
    --APO13240 Processing of parts lists
      --AP13241 Modular parts list
      --AZ13245 Modular parts list print
      --AP13242 Structural parts list
      --AZ13246 Structural parts list print
      --AP13243 Comprehensive parts list breakdown
      --AP13244 Comprehensive parts list storage, maintenance
      --AZ13247 Comprehensive parts list print

  --AUL1325 Compilation of Outlines from Structural Documentation
    --APK13250 Outlines from structural documentation
      --AP13251 Modular outline of use
      --AZ13255 Modular outline of use print
      --AP13252 Structural outline of use
      --AZ13256 Structural outline of use print
      --AZ13257 Comprehensive outline of use print
      --AZ13258 Printout of final items print
      --AZ13259 Printout of produced items print
      --AZ13260 Printout of procured items print
      --AZ13261 Printout of superfluous items produced print
      --AZ13262 Printout of superfluous items procured print

```
--ASU133 Technological Preparation of Production
  --AUL1333 Processing of Technological Processes
    --APK13330 Technological processes
      --AP13331 Technological processes
      --AP13332 Technological processes
      --AP13332 Technological processes      print preparation and print

  --AUL1334 Processing of Outlines from Technological Documentation
    --APK13340 Outline from technological documentation
      --AP13341 Outline of the need and use of tools
      --AP13351 Supplementing of additional data for preparations
      --AZ13342 Outline of the need for equipment 1                    print
      --AZ13343 Outline of the need for equipment 2                    print
      --AZ13344 Outline of the use of equipment                        print
      --AZ13345 Technological documentation                            print
      --AP13346 Comprehensive outline of the need for equipment
      --AZ13347 Comprehensive outline of the need for equipment        print
      --AP13348 Outline of the occurrence of work facilities and centers 1
      --AP13349 Outline of the occurrence of work facilities and centers 2
      --AZ13350 Outline of occurrence of work facilities and centers   print

--ASU134 Generation of THN and Production Normatives
  --AUL1341 Processing of Comprehensive Output Norms
    --APK13410 Comprehensive output norms
      --AZ13411 Comprehensive output norms          print

  --AUL1342 Processing of Comprehensive Material Norms
    --APK13420 Comprehensive material norms
    --AZ13421 Comprehensive material norms          print

  --AUL Computation of Operational and Basic Calculations
    --APK13440 Production calculations
      --AZ13441 Production calculations             print

  --AUL1345 Computations of Interoperational Price List
    --APK13450 Interoperational price list
      --AZ13451 Interoperational price list         print

  --AUL1347 Computations of Times Needed for Production
    --APO13470 Computation of time needed
      --AP13471 Generation of transportation time tables
      --AP13472 Computation of time needed

--ASU135 Generation of TPV DZ [data base]
  --AUL13551 Generation and Maintenance of TPV DZ
    --APU00101 Preprocessing of data
      --AP13001 Program generation phase for ZDPOL
      --AP00042 Storage of anchoring points
      --AP13002 Program generation phase for KUSOV
      --AP13003 Program generation phase for TEOPE proper
```

--AP13K03 Program generation phase for TEOPE cooper.
--AP13004 Program generation phase for NAROP
--AP13005 Program generation phase for TEXTY
--AP13006 Program generation phase for NAPRA

--APK13511 Storage and Maintenance of Data
--AP13500 Occurrence of segments under ZDPOL
--AP13501 Storage and maintenance of ZDPOL
--AZ13001 Changes made in ZDPOL print
--AP13502 Storage and maintenance of KUSOV
--AZ13002 Changes made in KUSOV print
--AP13503 Storage and maintenance of TEOPE
--AZ13003 Changes made in TEOPE proper
--AZ139K3 Changes made in TEOPE cooper.
--AP13504 Storage and maintenance of NAROP
--AZ13004 Changes made in NAROP print
--AP13505 Storage and maintenance of TEXTY
--AZ13905 Changes made in TEXTY
--AP13506 Storage and maintenance of NAPRA
--AZ13906 Changes made in NAPRA print
--AP13507 Items for changes in computed data
--AP13509 Storage of tables into phase library
--AP13012 Logic controls of parts lists linkages

--AP013510 Storage and Maintenance of Computed Data
--AP13510 Computation of technological levels
--AP13511 Storage and maintenance of technological levels
--AP13512 Maintenance of structural limit
--AP13513 Variable costs, outputs, calculations
--AP13514 Generation of identifier sets
--AP13515 Fixed costs, outputs, calculations
--AP13516 Norms for work facilities
--AP13517 Storage and maintenance of work facility norms
--AZ13917 Changes made in work facility norms print

--AUL1354 Technoeconomical Assessment of Posted Changes
--APK13540 Technoeconomical assessment of posted changes
--APK13541 Technoeconomical assessment of posted changes

--AUL1355 Conversion of MARS Data Base Into VARS Data Base
--APK13550 Conversion of DZ MARS into DZ VARS
--AP13551 MARS-VARS conversion for ZDPOL
--AP13552 MARS-VARS conversion for KUSOV
--AP13553 MARS-VARS conversion for TEOPE
--AP13554 MARS-VARS conversion for NAROP

5. Input Information of TPV VARS Subsystem

Generation of a TPV data base is a time-consuming affair demanding on capacity. Its generation is participated in primarily by personnel of specialized design and technology units.

During data base generation are eliminated all discrepancies between structural documentation, technological documentation and the price list of materials. It can be said that the generation of the TPV VARS subsystem's data base represents at the same time a demanding verification of the enterprise's largest data base, constituting the first and important contribution made by automation.

A data base can be generated:

--From primary data entered into acquisition forms by
  --perforation onto punch cards or
  --transfer to a floppy disk.

The format of the thus obtained data must be adjusted together with undertaking formal and logic control of data elements and of the linkages between individual related sets.

--From technical documentation with the aid of means of interaction, e.g., by SMEP computers with the systems COLEM, PPPD1, etc.

This method of data acquisition is highly viable and substantially cuts down on the time needed for data base generation.

--Format adjustment and data selection from another TPV system, provided that their information carriers are compatible.

The TPV VARS subsystem requires the following information for data base generation and for its own functioning:

Primary data for produced items
Primary data for parts lists linkages
Primary data for operations in technological processes
Primary data for preparations and special equipment
Descriptions of technological operations
Substitute work facilities
Wage rates
Production overhead of centers
Interoperational transportation times of centers
Administrative, supply and marketing overhead rates.

From the MTZ subsystem it needs the generated price list of procured items and from the ODBYT subsystem the wholesale prices of produced items for computation of production calculations.

6. Output Information

The TPV VARS subsystem was generated in the first stage only for batch processing of information. Batch processing will be supplemented in the second stage in the case of some items by interacitve processing.

All output information in the first stage of the TPV VARS subsystem processing has the form of reports generated by a high-speed printer. The reports thus turned out are of two types:

--program protocols
--type output reports of the subsystem.

Each program of the TPV VARS subsystem generates during its run a protocol on the printer which informs the user of the progress of processing. The protocol contains a printout of:

--errors occurring during computation and the program's reaction to them,
--statistical data about the program run, such as the number of processed sentences and computation time.

Type output reports of the TPV VARS subsystem are generated by means of the P03009 parametric printing program and it is assumed that the user himself will generate them according to his ideas and needs. As users have the opportunity to generate various TPV data bases, generation of a type output report is unrealistic. Thus, the output reports envisioned by designers are merely a sample of how an output report can be processed. Their utilization by users is not anticipated.

Outline of type reports of the TPV VARS subsystem:

Modular parts list
Structural parts list
Comprehensive parts list
Modular outline of application
Structural outline of application
Comprehensive outline of application
Printout of final [product] items
Printout of items being produced
Printout of procured items
Printout of superfluous items produced
Printout of superfluous items procured
Technological processes
Outline of needs for equipment
Outline of equipment utilization
Technological documentation
Comprehensive outline of needs for equipment
Outline of availability of work facilities and centers
Comprehensive output norms
Comprehensive material norms
Production calculations
Interoperational price list

7. Dialogue Mode in TPV VARS

In the second stage of TPV VARS subsystem generation, selected tasks will be dealt with by the dialogue mode. The actual selection of tasks in the

TPV VARS subsystem was based on the attained level of dealing with the project at hand and on whether this mode is suitable for dealing with the given problem. In processing of some problems, continued batch processing of data appears more viable. The selection criteria took into consideration the capacitative possibilities of the designers, the planned deadline for completion of the state project (September 1984) and the relatively limited means of the DOS-3 operating system for supporting interaction. For that reason the designers of the TPV VARS subsystem oriented their efforts in the second stage of the project to the modes:

--batch collection (acquisition) of data,
--mode DOTAZ [query]-ODPOVED [response].

Batch Collection (Acquisition) of Data

is considered to be the most basic type of interaction. It is of great significance to the TPV VARS subsystem. It substantially accelerates the stage of acquisition and preprocessing of primary and updating data which is of decisive importance to the extensive TPV data base.

The conventional method for preprocessing data is based on the use of clean-up programs to carry out formal and logic controls of primary or of updating data. The result of these controls is printed out into output error reports and on their basis the user can correct the identified errors. The entire clean-up cycle must be repeated for the corrected data. Experience gained in operation of the TPV VARS subsystem has shown that complete elimination of errors called for at least three clean-up cycles.

Acquisition and preprocessing of data via terminal substantially cuts down on the time needed. Control programs operated by the user through the terminal do not permit entering of an erroneous sentence into an output set. This mode of operation eliminates from the technology of data acquisition and preprocessing the need for punching or perforation that also constitutes a source of errors. The user, i.e., the employee of a specialized unit, is in direct contact with the computer without an intermediate link represented by perforating/punching. Moreover, the data preprocessing itself is carried out in one run without time-consuming repetition cycles.

Actual storage or updating of data by means of interaction is not feasible for the TPV subsystem, because it involves great quantities of data and the time lead gained by preprocessing of data would be lost. Nevertheless, designers intend to provide even the TPV VARS subsystem with the possibility of performing updating via a terminal in isolated cases. Whoever would perform this updating would have to be familiar with the data base concept and the logic linkages between individual segments.

DOTAZ-ODPOVED Mode

Conditions for the dialogue mode were created already in the generation of the first stage of the TPV VARS subsystem generation. The TPV VARS data base

was supplemented by a large number of computer information. This information, the computation time of which is considerable, represents approximately 50 percent of the TPV VARS data base. This information forms the basis for implementation of the DOTAZ-ODPOVED mode. The system offers the user from a specialized unit on the terminal a display of which problems he can process in the dialogue mode. In the TPV VARS subsystem this will involve the following:

Modular parts list
Modular outline of applications
Values of the comprehensive output norm
Values of the comprehensive material norm
Values of production calculations
Values of time needed and values of components of which the time needed is composed.

The user obtains these computed values through a specified identification number which he selects via the terminal located in his place of work.

The TPV VARS subsystem also provides for linkage to the TPV SMEP subsystem, which by means of the GOLEM system provides for preprocessing of data for the TPV VARS data base.

8. Use of APV TPV VARS in ASR of TPV

TPV is the basic and decisive component of an enterprise which determines the quality of a product, its technology and efficiency of production in general.

Generation of ASR in the area of TPV is a long-term creative process. Its objective is rendering management, design, technological and other activities more efficient as the basic prerequisite for the successful functioning of TPV.

Generation of ASR TPV calls for an analysis and assessment of the current state and determination of goals that can be achieved by automation. On this basis the areas in which the enterprise wants to implement automation and harmonize the operation of automated and non-automated functions in TPV must be determined.

The first and basic prerequisite for every information system is a uniform, suitably arranged data base, a particularly difficult problem to solve in TPV.

Generation of a TPV data base as the key information base for the entire sphere of production in general presupposes the selection of data elements which the enterprise intends to utilize, the generation of a uniform system of numerical codes and sorting codes while respecting those with nationwide validity, harmonization of the nomenclature of items. Then there is a need for setting up a precise organization for the acquisition of primary and of updating data, with individual specialized units being responsible for individual data elements.

The TPV VARS subsystem does not represent an ASR of TPV, but is applicational software which should become the backbone of automated operations in TPV. Designers of a specific ASR of an enterprise gain through it an insight into areas which are or will be automated in subsequent stages of APV generation. It also provides an orientative outline of all the basic informational linkages to other units of the enterprise sphere. It is based on the ASR Model Catalogue of organizations which is valid nationwide and provides all basic informational linkages to other subsystems of the VARS system.

It offers a list of data elements and numerical codes used in TPV which respect edicts of nationwide validity. It has its own program apparatus which facilitates the generation and updating of the TPV data base on a modern data bank principle and a program apparatus for utilization of this data base, primarily in the area of generation of TH norms and documentation for standardization and normalization of components.

Designers of ASR TPV should consider, in making decisions about the potential usefulness of a piece of type applicational TPV VARS software, whether the enterprise has an adequate analyst/programmer capacity which would enable it to generate within an affordable time frame its own software for TPV that would provide all the necessary linkages to the enterprise's regional subsystems.

Consideration must be given to TPV VARS functions which can be used in their entirety and those that will have to be adapted to suit the enterprise's specific conditions, or which the enterprise will eventually have to generate by itself. Many of the so-called specific conditions applying to an enterprise can be dealt with organizationally, without requiring posting of changes in programs.

Use of the TPV VARS type project considerably cuts down on the time needed for the generation of ASR for TPV. From the nationwide viewpoint, the project itself shows an integrating effect on the sphere of TPV.

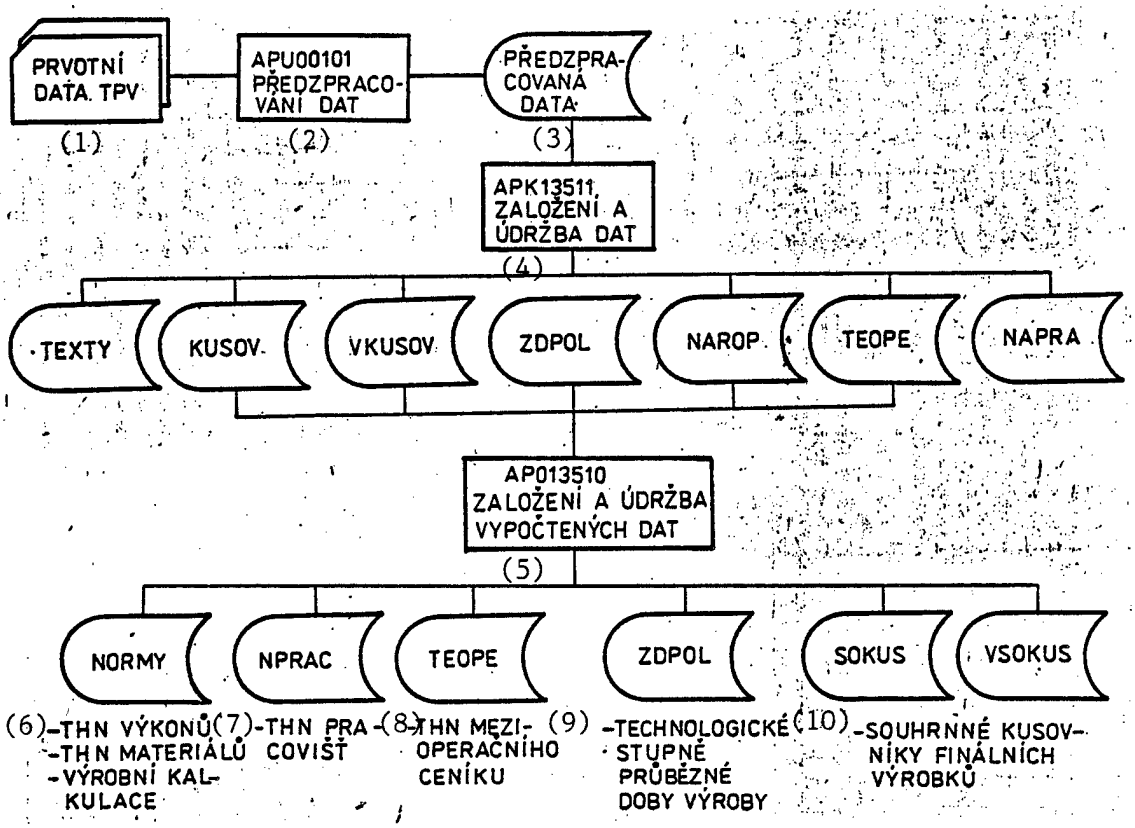

Figure 1. Outline of TPV data base generation

Key:
1. Initial TPV data
2. Preprocessing of data
3. Preprocessed data
4. Data storage and maintenance
5. Storage and maintenance of
6. THN of outputs, THN of materials, production calculations
7. THN of workplaces
8. THN of interoperational price list
9. Technological levels, average production times
10. Comprehensive parts lists of final products

[All other abbreviations taken from text]

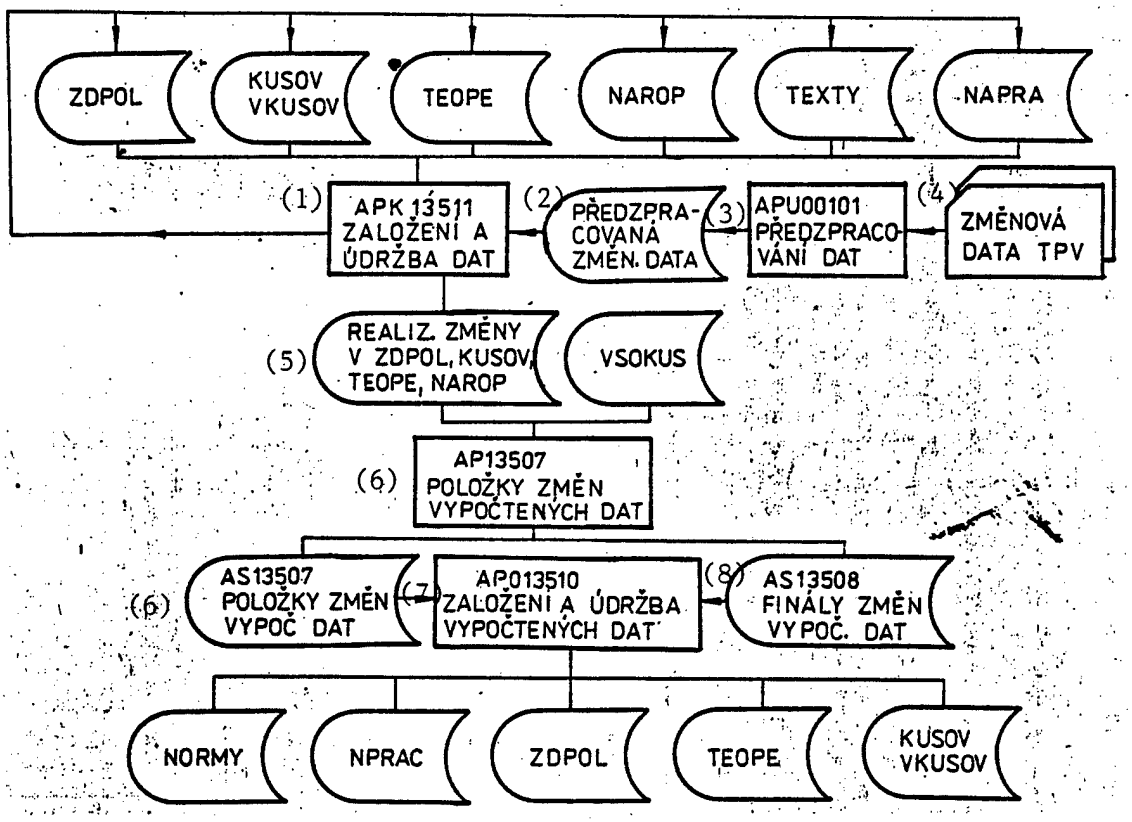

Figure 2. Outline of TPV data base updating

Key:
1. Storage and maintenance of data
2. Preprocessed changing data
3. Preprocessing of data
4. Data changing TPV
5. Posting of change in ...
6. Items of computed data changes
7. Storage and maintenance of computed data
8. Final changes in computed data

[All abbreviations taken from text]

VARS SMEP Tests

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 17-20

[Article by sk: "National Tests of VARS SMEP System," compiled from final national tests reports]

[Text] National tests of the VARS SMEP system, which represented a significant stage in the solution of this problem as part of the federal project P 04-119-214 "Applicational JSEP and SMEP Software," took place on 6 and 7 December 1983 in Prague. The solution of the considerably extensive

project, coordinated and controlled by the Kancelarske stroje [Office Machines] fiduciary concern organization (kuo), was participated in by fraternal organizations--Institute for Systemic Engineering in Slovak Industry, Institute of Economics in Prague, Datasystem kuo Bratislava (branch in Zilina), Inorga Prague, International Telephone and Telegraph Center in Prague and Office Machines branches in Brno, Plzen, Ostrava, Hradec Kralove and Gottwaldov.

The actual analytical and program design of the VARS SMEP [multilevel automated system of management/system of small electronic computers] is based on the philosophy of VARS, which is also intended for EC 1025 computers of generation 3.5. Under CSSR conditions VARS represents the most extensive system of applicational software for enterprise management most easily accessible to users. Not only theoretical knowledge of management was used in its generation, but also the today already relatively vast practical experience gathered in the generation and use of type applicational software. In comparison with the still used applicational software in the sphere of ASR [automated systems of management], the VARS system is on a qualitatively higher level. Moreover, the VARS SMEP system facilitates interactive methods of processing. Processing in real time in interaction with a JSEP computer within a computer network will become available for selected ASR systems . in the second stage of the VARS SMEP system design. That will make it possible to use the VARS system even in organizations with extensive, hierarchically arranged ASR.

The VARS SMEP system is type applicational software intended primarily for ASR of organizations in the economic enterprise sphere in that the specific parts of it which serve for control of production and its technical preparation follow a type design for machining production or production with similar characteristics. In view of the principles of VARS SMEP implementation and the flexibility of the entire system it is realistic to assume that the APV of some subsystems not directly tied to a type of production or an organization's main type of activities will be available for application even for organizations with different production characteristics, and even for organizations not oriented toward production. The VARS SMEP system is intended for the Czechoslovak SM 4-20 and SM 52/11 computers. In view of the limited possibilities offered by the peripheral systems (primarily cassette disk memories) of SMEP minicomputers, this applicational software will for the time being be oriented toward and used in smaller organizations. A substantially wider application of the VARS SMEP system with full utilization of its potential applications will become possible only after supplementing these minicomputers by disk memories with a high capacity.

The object of national tests was the verification of the functional and program design of the following subsystems:

TPV--Technical preparation of production
ORV--Operational production control
OBD--Marketing
ZAP--Long-term production assets
MTZ--Supply operations

EKI--Economic information
PAM--Personnel and wages
VDF--Higher supply forms

The objective of national tests was to check:

--the function of the applicational software devised for partial VARS SMEP tasks,
--whether the design meets the intended use and attains the specified technoeconomic criteria,
--whether the devised programs and documentation meet the conditions for acceptance into the NOTO [National Technical Service Organization] library of programs,
--whether the devised programs and documentation meet the valid methodological guidelines.

The committees of specialists nominated for national tests were composed of representatives of the State Commission for R&D and Investment Development, sectoral ASR centers, general management of the ZAVT [Plants of Automation and Computer Technology] concern, specialized chairs of institutions of higher learning, the Association of JSEP and SMEP Users, organization engaged in ASR planning and representative of users.

Results of the national tests proved to be very favorable. Final protocols confirm that the specified objectives were met to their full extent and the devised programs are fully ready for use on SMEP computers. TAPV devised in the first stage encompasses approximately 80 percent of type elements (operated primarily in batch mode). The remaining part of type elements (including expansion in the area of interactive processing) will be completed in 1984, but it can be stated that the national tests did cover the complete core of APV VARS SMEP centrally provided for utilization of SMEP in the Eighth 5-Year Plan.

Functional verification of the VARS SMEP design was carried out in the computer center of Office Machines kuo in Prague, Radlicka Street, on the SM 4-20 computer on the basis of the 2.0 version of the DOS RV operating system, including espansion for OS-RSZ, DTS, COBOL, SORT. It involved processing of a control example, verification of its results, assessment of the effectiveness and efficiency of processing, forms and contents of procedures for providing contact of the user with the computer system by means of a terminal.

Processing on the computer progressed without any problems. Even though the VARS SMEP system is conceived in the first stage for operation in remote mode, interactive processing is already becoming prominently reflected in selected aspects, e.g.:

--in the ODB subsystem during control of expediting of shipments and billing,
--in the PAM subsystem in the area of operation with the basic information file of personnel and continuous projection of data for computation of wage components of both variable and permanent nature,

--in the ENE subsystem in the component of dispatcher control of the consumption of electricity and gas in real time,
--in the VDF subsystem in processing of the work backlog.

Flexibility in the system for accommodation of changes that the user can introduce into the type APV is provided in the area of preparation and processing of data by the all-purpose systems GOLEM and PDMS. A generator of printout formats is available in part (in the ZAP and EKI subsystems fully).

Checking of documentation was oriented toward verification of the conformity of compiled documents with the normative requirements of the VARS system and the key project engineer. The committee checked the submitted documentation for completeness and compared it with task input and methodologies. It checked for agreement with input. Documentation for single-stage projects includes program documentation, a user and operator handbook with documentation of the control example, it is modular and uniform for all subsystems of the first stage. Documentation of data elements used in VARS SMEP corresponds to the Catalogue of Data Elements which is uniform for the entire VARS system. Individual single-stage projects make use of a uniform forms technique meeting VARS norms. The system of VARS SMEP documentation makes it possible to use selected parts of the technical project of VARS SMEP and the follow-up single-stage implementation projects of subsystems as type project documentation for building of ASR, and to incorporate them directly into the documentation of specific ASR projects. The committee further recommended to meet the needs of users by providing an integral description of the method of documentation in the system's user handbook (overall description of the system) together with instructions for its use in devising specific ASR.

Outputs of the type applicational VARS SMEP software, verified by national tests, constitute one of the key applicational products promoting the implementation of Presidium of the CSSR Government Resolution No 157/83 in part II/2a, b, i.e., continued coordination and unification of APV generation. Application of the devised TAPV VARS SMEP promotes within ASR implementation specific measures toward improvement of the system of management of the national economy. Not to be overlooked is the considerable contribution of the type solution to saving project and programmer capacities together with accelerating the use of ASR in the user sphere.

National tests were the culmination of testing and control efforts prior to turning the VARS SMEP system over to the NOTO Library of Programs and its subsequent turning over to the users. This system will be distributed to users of SMEP minicomputers as of the second quarter of 1984. Its distribution and services connected with its turning over will be provided by the coordinating center for APV SMEP, Office Machines kuo, 150 00 Prague 5, Radlicka Street 2.

More detailed information about the VARS SMEP system was published in VYBER 5/83.

Computer-Aided Electroplating Lines Design

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Slovak No 1, 1984 p 20

[Article by -kl-: "Computer Technology in Kovoprojekt," compiled from press conference notes]

[Text] Kovoprojekta Bratislava introduced itself at the international chemical fair INCHEBA '83 within the INTERANTIKOR '83 section as the expositor of an automated system for computer-aided design of electroplating lines.

The KPB (Lovoprojekta Bratislava) was established in 1969. It gradually expanded and today it is a state economic organization with an enterprise in Bratislava, a plant in Presov and a branch in Ruzomberok. The KPB is a comprehensively specialized design and engineering organization engaging in planning constructions of an engineering nature, and acts as general contractor for construction projects at home and abroad and offers advisory and consultation services in the area of capital construction, redevelopment and modernization of engineering and electrotechnical plants.

KPB provides comprehensive processing of project documentation, i.e., including the technological, construction and energy part and projects for organization and control of production. The KPB devised an automated system for design of electroplating lines. The system was developed on the WANG 2200 computer by a team of technological and systemic engineers who managed to come up with a program simulating the work of a designer. The new system changes completely the static character of designing. It almost excludes any subjective approach of the designer in dealing with a project by building optimization elements into the program.

During its 25 years of operation the KPB has devised project documentation for a great number of operational systems for surface finishing for various construction projects both at home and abroad.

Culture Ministry Computer Technology

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 21-31

[Article by Eng Vladimir Smejkal, Institute for Information and Management in Culture, Prague: "Overall Technical Concept for Implementation and Application of Computer Technology Within the Jurisdiction of the CSR Ministry of Culture"]

[Text] 1. Introduction

The Institute for Information and Management in Culture [hereafter IIMC] devised between September 1982 and February 1983 the Overall Technical Concept for Implementation and Application of Computer Technology Within the

Jurisdiction of the CSR Ministry of Culture [hereafter CSR MC] [1]. Somewhat later, but as in other jurisdictions, there came to the fore the need for developing a uniform concept for the implementation of computer technology and its subsequent utilization within MC's jurisdiction. These efforts were spurred primarily by the new economic management of the CSR MC and were also necessitated by the objective needs brought about by the stagnation that was becoming apparent in the development and introduction of ASR subsystems within the MC.

The objective of this article is to summarize the proposals for equipping the MC sector with computer technology, based on realistic possibilities and accessible hardware on the basis of agreements concluded with two key processors (see below) outside of the sector and establishing a network of minicomputers throughout the CSR cultural sector. It is also proposed to provide means for text processing in order to cut down on the labor-intensive nature and improve the efficiency of clerical, office and administrative operations which are not automated at all or are less than adequate for the general resources of computer technology.

2. Current State in the Area of Computer Technology

The sphere of computer technology application in the CSR MC could be divided in essence into the following areas:

1. Sectoral automated system of management in culture (hereafter OASRK).

2. Tasks dealt with as part of establishing the automated information system for national committees (hereafter AIS NV).

3. AIS [computerized information system] and ASR of enterprises and organizations controlled by the CSR MC.

4. IIMC's own R&D within SPZV [federal program for basic research] or SPEV [expansion unknown; possibly federal program for electronization of production (vyroby) or research (vyzkumu)] "Improvement of the System for Management of Culture."

OASRK can be characterized by two basic functions which delineate its sphere of application:

a) departmental control system related to direct control functions of the CSR MC,

b) sectoral information system which comprises those activities of legal and physical subjects from all ministries through which are manifested the variegated cultural needs and interests of the populace and the direct or indirect methods for satisfying them. It also respects the indirect control functions of the CSR MC, particularly conceptual, coordinative, legislative and methodological functions [2].

One of the key problems that affected the introduction and application of computer technology, primarily in the OASRK area, is the fact that there is no ministerial computer center. There is none available at the present and it is not envisioned to establish one in the future. The individual directly controlled organizations process their selected tasks on many varying types of computers in many centers located in Prague and outside of it. Thus, processing of OASRK tasks and subsystems from the viewpoint of hardware is extremely splintered, offering little orientation, and, in many cases, lacking any concept at all. Moreover, processing is highly ineffective and leads to increasing costs by several multiples and a drainage of considerable financial costs from the ministry.

OASRK subsystems can be divided into:

A--Cross-Sectional OASRK Tasks

1. Cadres
2. Cultural personalities and creative artists
3. Logistical base of culture (raison d'etre of cultural institutions)
4. Financing of culture
5. Cultural contacts with abroad
6. CSR MC's own ASR for top management

The listed cross-sectional OASRK tasks form its basic information structure in that they collect and integrate information about the basic instruments of management in culture, about effectiveness of the management process and about cultural political, social, institutional and territorial aspects of cultural activities.

Among other things, use will also be made to this end of information collected and processed in collaboration with AIS NV and its nationwide cross-sectional tasks [3].

B--Sectional OASRK Tasks

The sectional OASRK tasks--the thematical contents of which is specified with adequate precision for the purposes of this article by its title--include, e.g., Music, Collections, Federal Environmental Protection, Movies-Film, etc. These tasks contain information relevant to the activities of centrally controlled institutions as well as those of cultural institutions controlled by NV, and by other ministries. The degree to which these tasks have been completed shows great variance, their development and implementation being participated in by many collaborating organizations. Nevertheless, some of them are already on the threshold of implementation (e.g., Music) and await procurement of the relevant computer technology resources.

C--Enterprise Tasks

A part of OASRK is also constituted by enterprise tasks which are dealt with primarily at the level of large economic organizations for their own needs (Pragokoncert, Knizni velkoobchod [Book Wholesalers]). Some of these tasks

will be additionally used as sources of data for some cross-sectional and sectional OASRK tasks.

Large computer technology is available for hardware back-up of selected tasks--particularly cross-sectional and top management--accessible in the form of external cooperation and, on the other hand, a process of procurement of small computer technology--that will represent the focal point of processing capacity--is under way.

An agreement was concluded in 1982 between the CSR MC and FSU [Federal Bureau of Statistics] regarding the utilization of FSU's computer systems to meet the following objectives:

1. Put at the disposal of CSR MC high-performance computer resources for dealing with the most pressing tasks of top management;

2. Make data available from the central data bank of FSU or CSU [Czech Bureau of Statistics] to meet the ministry's needs;

3. Provide linkage between these and other top agencies of state and federal administration.

Tasks dealt with by UISK and other cultural organizations in cooperation with CRS MC within the AIS NV complex are intended exclusively for processing through the Computer Technology enterprise, currently on EC 1021, 1030 computers. Selected tasks are to be gradually transferred in the nearest future to the EC 1025/26 computers, of course only in cases where such transfer is economically effective and feasible.

Cross-sectional and sectional subsystems, not to mention the subsystems of enterprises, are now operated on computers nearing the end of their service life used by various processors (EC 1021, DATASAAB D22, etc.). These and newly devised subsystems will have to be processed on CSR MC's own computer technology installed on its premises or those of its Institute for Information and Management.

A description of the current status of computer technology utilization is given in abbreviated version in tabular form. The identified data were acquired through a survey conducted by UIRK personnel directly "in the field" in the latter half of 1982 and apply to those directly controlled organizations of the ministries which already use computer technology or are making preparations for its application in future years. The needs of these organizations can be divided from the qualitative aspect into three categories:

A. Promotion of efficiency and economy in the processing of routinely generated data oriented toward manpower savings, cutting down on processing time and improving the organization's output.

B. Promotion of efficiency and economy in recordkeeping by the generation of extensive registers oriented toward potential multicriterial retrieval of information from extensive data sets.

C. Promotion of efficiency and economy in clerical and administrative operations which do not lend themselves effectively or at all to transferral to computer technology resources.

A. Promotion of Efficiency and Economy in Processing of Routinely Generated Data

The first category of users already use computer technology to a considerable extent. Most of the operated systems do not call for processing of sets exceeding 30 MB. Herein prevails batch-type processing which with the computer system employed is the only one possible. Most of the systems in operation, with the exception of the "New Issues Listing" of the Knizni velkoobchod enterprise, do not call for strictly set deadlines for processing while, on the other hand, the existing hardware back-up precludes improvement in the efficiency and economy of operations with strict deadlines.

B. Promotion of Efficiency and Economy in Recordkeeping by Generation of Extensive Registers

The use of computer technology in the second area oriented toward the generation and administration of extensive data sets (data bases) is not very developed for the time being. An example of such systems are the OASRK, KADRY, PASPORTY subsystems and others. The key problems attendant to the establishment of such systems are particularly:

--devising of filing systems for arrangement of data,
--acquiring proficiency in the preparation of input data,
--hardware back-up for data sets ranging from tens to hundreds of MB.

Individual systems will show in specific cases considerably different characteristics--e.g., frequency rate of inquiries, response time or linkages between data sets. Such specific cases can be constituted, e.g., by the following systems:

1. The State Institute for Care of Historical Monuments and Environmental Protection is preparing the automated MONUMIS and NATURIS systems which are dependent on other automated systems of other ministries.

2. Another specific example are the problems attendant to the CSR State Library, where improvement of the system for library management is closely tied to automation of lending services--see also [4]. In this area is envisioned a high frequency rate of inquiries, long stand-by times and acceptable response time of the interactive system with external memory capacity on the order of several hundred MB.

C. Promotion of Efficiency and Economy in Clerical and Administration Operations

Simplification of the administrative aspect of management has not been attained for the time being to the extent provided by technical possibilities worldwide. While, on the one hand, we talk of computers of generations 3.5 and 4, the last great innovation in administration in our country were electric typewriters and calculators. If we take a look at the thematical contents of operations in a typical office, we can see that the work of personnel is oriented primarily toward one of the following tasks:

--correspondence,
--compilation of summaries, reports and statistics,
--secretarial agenda, entries, etc.,
--compilation of concepts, reports, assessments, statements, etc.

The narrowest bottleneck in this area is still typewriting, which is very time-consuming even for highly qualified specialists. Automation would do away with this bottleneck which is encountered both in the CSR MC office structure and in some other facilities engaged in an extensive editing and correspondence agenda--e.g., the Institute for Cultural Education, Institute for Cultural Research, the National Theater, the National Gallery, etc.

The advantages offered by centers for automated processing of texts have been published many times on the pages of VYBER and there is no need to scrutinize them in detail. It appears that more is to be gained for use within the CSR cultural sector by the systems currently available and routinely produced by CEMA countries (ISOT 10002 S from Bulgaria, Robotron A 5010 from GDR) and, primarily, by the eagerly awaited production of the systems for text processing and rendering office operations more efficient in the CSSR, based on the SM 50/40 and SM 6921 microcomputers, or the EC 9110, based on the Consul 271 system.

The installation of such systems, first in the CSR MC's own office and later in other operational centers of the ministry, should be dealt with as early as 1983-1985 as part of this overall technical concept.

3. Proposed Overall Technical Concept for CSR MC Department

A comparison of all domestically accessible computer systems and their characteristics was undertaken as part of the process of assessment and selection of suitable computer technology for meeting the above-described requirements within the CSR MR jurisdiction. It involved:

a) budgeted large and medium computer technology (EC 1011, EC 1025, EC 1045, EC 1055),
b) budgeted small computer technology (SM 3-20, SM 4-20, SM 52/11),
c) computer technology supplied beyond budget (ADT 4400, ADT 4500, SAPI),
d) computer technology, other than JSEP-SMEP, imported from CEMA countries.

The comparisons involved the following characteristics:

1. maximum capacity of memory
2. processing speed

3. connectable peripheral systems
4. software
5. the system's method of operation
6. data compatibility with JSEP
7. potential for interconnection with the state administration's computer network
8. reliability
9. demands on installation and operation
10. acquisition price
11. continued development of the system
12. delivery deadline and conditions

In view of the existence of the agreements concluded with the two key processors (FSU, PVT) outside of the ministry and the results of the analysis of available systems and their properties under the ministry's conditions, it was resolved to adopt the following conclusions:

Establishment of a ministerial computer center with a type EC 1025/26 computer or larger is not adequately effective in view of the

--differing nature of tasks and specific requirements of organizations,
--inadequate distribution, technical and cadre back-up,
--modern trend in application of computer technology oriented toward minicomputers which today can provide an economic substitute for medium large computers.

Supplement and interlink the large computer technology available at FSU and PVT with a network of minicomputers which would lead to their mutual interchangeability as well as improved reliability and readiness of the entire system.

1. Stop importing small computer technology from abroad and become oriented toward domestic technology exclusively.

2. Use the automated systems SAPI-R (JPR 12-R) exclusively for data acquisition or as control centers, and only in exceptional cases.

3. In accordance with the above-described objective indicators and other information about the experience gathered in operation and application by users, the most viable alternative appears to be use of the Czechoslovak ADT 4500 minicomputer with availability of centralized ministerial servicing and storage of replacement parts.

4. In the first phase of setting up a network of minicomputers, install the ADT 4500 computer in differentiated configuration due to the differing nature of processing tasks in the following ministerial organizations:

--Institute for Information and Management, Prague
--Phonograph Enterprises, Lodenice near Beround
--Supraphon, general management, Prague

--Research Institute for Audio, Video and Reproduction Technology (VUZORT), Prague
--National Theater, Prague.

The ADT 4400 could be used to meet the needs for scientific and technical calculations in VUZORT as its properties for such application are more suitable than those of the ADT 4500.

The ADT 4500 system under IIMC administration should be installed on the premises of the Valdstejnsky Palace, where there should be established an internal network for the CSR MC, the IIMC and locally relevant organizations under direct control, the State Institute of Care for Historical Monuments and Environmental Protection, as well as the Administration of Cultural Installations, primarily its Department for Contacts Abroad. A network of display terminals with printers will make it possible to achieve the required operational readiness of selected agendas and provide constant access to computer technology.

5. Consider eventual equipping of the Knizni velkoobchod's computer center with two ADT type minicomputers with extensive peripheries, the EC 1011/B computer from Hungary, or the EC 1026/27.

6. Install and operationally verify a device for automated processing of texts within the CSR MC office. Depending on the gathered experience, make it gradually available to other components of CSR MC and some directly controlled organizations.

4. Conclusion

The closest objectives and tasks called for by the Overall Technical Concept of the CSR Cultural Sector are:

a) successfully install and utilize with adequate effectiveness computer technology and machines for administrative organizational operations as proposed in the present concept;

b) install additional computer technology in the ministry on the basis of gathered experience;

c) develop a ministerial ASR and computer technology center with an adequate specialized capacity comparable to the hardware of the IIMC which would perform conceptual, developmental, consultational and implementational activities.

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[see table on following page]

Current status of and outlook for application of computer technology within CSR MC Jurisdiction

ORGANIZATION, ENTERPRISE	SUBSYSTEM, AGENDA	COMPUTER, PROCESSOR	RANGE [Kcs]	REMARK
Institute for Information and Management in Culture	1. Personnel records of MC and organizations under direct control	Datasaab D22, TST	250,000.-	Intent: acquisition of own ADT 4500 minicomputer
	3. NV personnel records	Datasaab D22, TST	100,000.-	
	3. Cultural installations entitlements	EC 1021, PVT Prague	162,000.-	
	4. Personalities	conceptual project		
	5. Music	technical project		
	6. Cultural contacts with abroad	FSU		
	7. Financing of culture	project task		
	8. Collections	exp. verification, EC 1021, PVT Prague		
National Theater (ND)	1. Record of long-term assets	intent		Intent: acquisition of VT-20 office minicomputer and ADT 4500 minicomputer
	2. Business dept. agenda			
	3. ASR ND	project task		
State Institute for Care of Historical Monuments and Environmental Protection	1. MONUMIS - AIS of care for historical manuments	technical project		Intent: Minicomputer in the Eighth 5-Year Plan
	2. NATURIS - AIS of environmental protection	project task		
CSR State Library	1. Automated national bibliograohy system	exp. verification Wang 2200, FMTIR*		Intent: acquisition of own computer system with a high-performance computer
	2. Automation of central catalogue	intent		
	3. Storage and accounting records	exp. verification EC 1040, UTZ UBTEI*		
National Gallery	1. Record of art works	exp. verification HP 45-48, inst. of management		Installation of own computer technology in. Exp. Palace under consideration
	2. Record of long-term assets, wage and NHE agenda	intent		
National Museum	1. Statistical analyses of musea activities	exp. verification EC 1021, PVT Prague		
	2. Automated record of collections	project task		

[continued on next page]

ORGANIZATION, ENTERPRISE	SUBSYSTEM, AGENDA	COMPUTER, PROCESSOR	RANGE [Kcs]	REMARK
Protective Association of Authors (OSA)	1. Record of Authors and compositions	IBM 370/148 UVT SPK*		
	2. Accounting for mechanical rights	IBM 370/148, UVT SPK*	230,000	
	3. Accounting for film rights	IBM 370/148, UVT SPK*		
	4. Accounting for broadcast rights	IBM 370/148, UVT SPK*		
	5. Accounting for television rights	intent		
	6. Accounting for public performance rights	intent		
Protective center for Performing Artists (OSVU)	1. Accounting agenda	IBM 370/148 SPK*	60,000	
	2. Tracking of royalties from TV, radio, etc.	intent		
DILO, CFVU enterprise [Czech Fund of Performing Artists]	1. Record of installment sales	EC 1021, Czechoslovak Ceramic Plants	165,000	Intent: acquisition of own VT-20 computer
	2. Customer billing records	EC 1021 Czechoslovak Ceramic Plants	82,000	
	3. Record and discontinuation of royalties	technical project		
	4. Record of authors	technical project		
Accounting center of OOA [Author's Protective Organization] at CFVU	1. Computation of income tax from artistic activities	EC 1021, Prumstav	150,000	Intent: use of VT-20 in
	2. ASR CFVU	intent		
Dilia [Theater and Literary Agency]	1. Royalties accounting	conceptual project on IBM 370/148 in SPK*		Intent: Robotron office computer
	2. Information system	intent		
Center of Handicraft Arts	1. Record of long-term assets	EC 1040, Military Construction (VS)	36,000	Additional back-up in cooperation with VS SHR [North Bohemian Lignite Basin] Most (SAPI-R)
	2. Wage records			
	3. Information system	intent		
ODEON	Readers' Club --shipments,	Datasaab D 22, TST*	1,600,000	
Vystavnictvi [Exhibits] natl. enterprise	1. Material records	Datasaab D 22, TST*	200,000	Additional expansion of agendas in cooperation with VS KVO nat'l. enterpr.
	2. Records of materials, storage, etc.	intent		

[continued on next page]

ORGANIZATION, ENTERPRISE	SUBSYSTEM, AGENDA	COMPUTER, PROCESSOR	RANGE [Kcs]	REMARK
Supraphon VHJ	1. Information system	Minsk 32, PVT* Nymburk	995,000	undergoing conversion to EC 1030 at same location ; intending conversion to EC 1021 in VS CKD
	2. Authorship rights to audio recordings	Datasaab D 22, TST*	120,000	
	3. Marketing	EX 1021, CKD Prague	315,000	
	4. Phonograph Club	EC 1021, CKD Prague	200,000	
	5. Market research	EC 1021, CKD Prague	3,000	Supraphon also intends to install SM 4-20 minicomputers
	6. Goods inventory	EC 1021, CKD Prague	10,000	
	7. Payments and royalties	EC 1021, CKD Prague	150,000	
	8. Maintenance of	EC 1021, CKD Prague	50,000	
	9. Wage records	intent		
	10. Monitoring of goods deliveries	intent		
	11. Automation of individual orders	intent		
Gramofonove zavody, n.p. [Phonograph Plants, nat'l enterprise] (GZ)	1. Accounting, record of long-term and short-term assets	DARO 1840		Intent: acquisition of ADT 4500 minicomputer
	2. ASR GZ	project task		
Research Institute for Audio, Video and Reproduction technology (VUZORT)	1. Scientific and technical calcul. and control of experiments	HP 9830, Wang		Intent: ADT 4400 minicomputer already acquired
	2. Operational and material bookkeeping	ICL 1903, VC CKD	9,000	
Albatros	1. Record of titles (edit. agenda)	Datasaab D 22, TST*	175,000	
	2. Young Readers' Club (KMC)	Datasaab D 22, TST*	330,000	
	3. Profit/loss records (expenses centers)	EC 1021, Prefa Malesice	30,000	
	4. Contract records	conceptual project		
	5. Bibliography	technical project		
	6. Info system	conceptual project		
	7. Printing production control	intent		
Knizni velkoobchod, n.p. [Wholesale Books, nat'l. enterprise]	1. New Issues Bul.	Datasaab D 22, TST*	800,000	Intent: install a modern computer operating in interactive mode
	2. Record of books on hand + add. orders	Datasaab D 22, TST*	1,400,000	
	3. Closing accounts of books on hand	Datasaab D 22, TST*	650,000	
	4. Contracting	Datasaab D 22, TST*	500,000	
	5. Textbooks	Datasaab D 22, TST*	615,000	

[continued on next page]

ORGANIZATION, ENTERPRISE	SUBSYSTEM, AGENDA	COMPUTER, PROCESSOR	RANGE [Kcs]	REMARK
	. Record of office expendables	Datasaab D 22, TST*	120,000	
	7. AZIKK*	Datasaab D 22, TST* exper. operation		
	8. REGLETA - book-store inventories for CSR MC	Datasaab D 22, TST*	80,000	

* Abbreviations not explained in the text:

AZIKK = automated processing of information pertaining to books
FMTIR = Federam Ministry for Technical and Investment Development
PVT = Computer Technology Enterprise
SPK = State Planning Commission
TST = Machining Technology Plants
UTZ = Central Technological Base
UVTEI = Institute for Scientific, Technical and Economic Information

16-Bit SMEP Series

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 33-62

[Article by Eng V. Vojtech, Office Machines, fiduciary concern organization: "Outline of 16-bit SMEP Series Supplied in 1984"]

[Text] 1. Introduction

In planning the installation of computers and, consequently, in drawing up orders for hardware, it is necessary to order not only the basic computer configuration and its individual peripheral systems, but also various communication adapters, structural and systemic elements, cables and installation parts to make the computer functional.

This article offers an outline of the individual basic configurations of computers and expansion items, but also mentions the relations between individual elements, i.e., it specifies what additional items must be ordered separately to enable the individual modules to function.

It also describes the procedure for selection of cables for systems using a series interface. In addition to basic data about technical specifications, structural design and availability, all items also contain data for ordering. In conclusion, comprehensive information about software is added.

The subsequent description relates to 16-bit SMEP computers operating on the principle of a common busbar.

It involves the following types of computers:

--SM 4-20 minicomputer,
--SM 52/11 minicomputer,
--SM 52/11 M 1 minicomputer,
--SM 50/50 terminal station,
--SM 50/50 M1 microcomputer.

These computers were or are being developed in the Computer Technology Research Institute (VUVT) fiduciary concern organization in Zilina and are produced in the Computer Technology Plants (ZVT) concern enterprise of Banska Bystrica, in the Namestovo plant. Services connected with marketing, installation, servicing, training, planning of computer centers, generation of applicational software, etc., are provided on CSR territory by the Office Machines fiduciary concern organization (f.c.o.).

2. Basic Characteristics

The basic characteristic feature of these compatible computers, i.e., SM 4-20, SM 52/11, SM 50/50, as well as of the SM 3-20 computers which were available till the end of 1983, is:

--a suitable systemic architecture using as its basis a common busbar to which is provided a uniform connection for a processor and other systems, including peripheral devices;

--an identical basic set of instructions which is further expanded for hierarchically higher computers of the mentioned series;

--the potential for using various operating systems in basic or modified form and other software;

--unification and modularity of structural elements and interfaces of electric circuits.

All of this provides for full technical compatibility and possible substitution from the lowest type of computer of this series up to the highest type and full program compatibility in an ascending direction. Thus, once a system has been installed, it is possible to expand it gradually by additional hardware with minimum software modifications or, if preferred, process all programs generated and tuned on a lower type of computer (e.g., SM 3-20) on a hierarchically higher type (e.g., SM 52/11).

All computers facilitate data processing by words (word = 16 bits) or by syllables (syllable = 8 bits).

Linkage between individual SMEP computers operating on the principle of a common busbar is provided by mutually transferrable memory media (magnetic tapes, magnetic disks, floppy disks) and a standardized interface for remote data processing (synchronous and asynchronous).

The SYRPOS 1 system under the DOS RV 2 operating system makes it possible to form homogeneous computer networks based on the above-mentioned types of computers. This connection is made technically possible by the CM 6002 (ASAD) asynchronous adapter, the SM 1208 (SAD) synchronous adapter, or the CM 8506 (SAD) with DDCMP procedure and the CM 8511 (AMU) asynchronous multiplex.

Linkage to the 8-bit SM 50/40 microcomputer system (with the MUOS operating system) operating with a differing architecture on the basis of a systemic busbar is provided by the PRENOS program under the DOS RV 2 operating system. The SM 50/40 system under the MIKROS operating system can operate under the DOS RV 2 operating system with the aid of the EC 8514 emulator.

Linkage to the JSEP [uniform system of electronic computers] systems is provided by mutually transferable memory media (magnetic tapes, or floppy magnetic disks), or it can be provided by a standardized interface for long-distance data transmission. The EC 8514 and EC 7921 emulation routines under the DOS RV 2 operating system facilitate cooperation with JSEP in batch or interactive mode. This connection is made technically possible by the SM 1207 (SAD B) synchronous adapter with the BSC procedure, or by the CM 8506 (SAD).

3. Structural Design

The basic structural element of all the mentioned minicomputers and the box-type design of the SM 50/50 microcomputer is a 19" box. The 19" module meets the IEC recommendation. Into these boxes are placed 19" SMEP modules, a processor grid and an expansion grid. Grid height in the box is given in the number of U, whereby 1 U = 44.45 mm. Each grid contains various systemic units into which are inserted individual plates (single-, double- and triple-connector). Control units of some systems take up an entire systemic unit. Unification and modularity of structural elements, interfaces of individual structural SMEP modules and program elements make it possible to keep expanding a system once it has been installed.

The basic structural unit of the SM 50/50 microcomputer in the terminal station variant is a display terminal containing the relevant modules, including the processor, memory and control units of peripheral devices.

4. SM 4-20 minicomputer

4.1 Characteristics

The SM 4-20 minicomputer is suited for the acquisition and preprocessing of data, for control of scientific and technical experiments, measuring centers, for mass data processing, for control of continuous and discontinuous technological processes, for generation of information systems and control of data bases, for control of computer networks, etc.

The processor provides for performance of the basic set of SMEP instructions (just as for SM 3-20 or the terminal version of SM 50/50) and an expanded

set of EIS instructions. After equipping it with the SM 4220 processor with a floating decimal point--which is an optional module--it can perform floating decimal point operations in single and double accuracy.

4.2 Basic Configurations of SM 4-20 Computer, Variant 1/4

1. Box

--processor grid of 7 U height containing

  --CM 2401 processor itself
  --SM 0205 simple timer
  --CM 2001 programmable timer
  --SM 0203 loading module
  --CM 3511 semiconductor working memory storage for 128 K words
  --CM 5105 cassette disk memory control unit facilitating connection of up to four cassette disk memory units, each with 5 M syllables capacity, CM 5400 or CM 5403 (the CM 5105 control unit will be replaced by the CM 5113 type which makes it possible to connect one additional CM 5410 disk unit)
  --CM 6002 (ASAD) asynchronous adapter for the CM 7202/S operator's terminal
  --SM 6001 (PAD 8) parallel adapter for the CM 7108 43 terminal with printer
  --CM 6001 (PAD 8) parallel adapter for the CM 6204 reader/perforator module of perforated tape
  --operator's panel
  --power feed sources
--CM 6204 (SPTP/3-Poland) perforated tape reader/puncher module or the CM 6200 (K 6200-GDR), reading speed 500/symbols/sec, perforating speed 50 symbols/sec, module height 6 U
--CM 5400 basic disk unit with 5 MB capacity
--CM 5400 expansion disk unit

2. Box

--expansion grid 7 U high containing
  --control unit of magnetic tape memories facilitating connection of up to four tape units of the types IZOT 5003, CM 5300, CM 5300.01, CM 5302, CM 5303 or CM 5311 with NRZI recording (this control unit will be replaced by the CM 5012 control unit which makes it possible to also connect the CM 5311 tape unit with PE recording)
  --SM 2014 common busbar termination module
  --power feed sources
--CM 5302 tape unit

Independent devices

--CM 7202/S alphanumeric display terminal
--CM 7108 43 terminal with printer
--desk for terminal, chair, complete cable connections, accessories.

4.3 Reserves for Expansion of SM 4-20 Basic Configuration

--free space 11 U high for 19" modules in expansion box
--two free CM 0101 systemic units (for 8 plates) in expansion box and one free CM 0101 systemic unit (for 4 plates) in processor grid
--free space for building-in of three systemic units into the expansion grid
--free position for optional SM 4220 processor with floating decimal point in the processor grid.

The subsequently listed technical expansion devices can be used for additional expansions.

4.4 Supplier Information

The basic configuration of the SM 4-20 minicomputer is offered in 1984 under the designation variant 1/4 and, in addition to the latter, also variant 2/4 or 3/4, which differ by having the module of perforated tape reader/puncher and the relevant CM 6001 adapter replaced by the CM 5605 memory module with a floppy magnetic disk with a control unit and SIMPLE DENSITY MOMFLEX 6400 disk units, or CONSUL 7113.

The SM 4-20 minicomputer is a viable product and its production is envisioned to last until 1988.

4.5 Basic Software

The SM 4-20 minicomputer comes with the DOS RV 2 operating system and languages MACROASSEMBLER/DOS RV, FORTRAN IV/DOS RV and BASIC/DOS RV and one of two optional languages, either FORTRAN IV PLUS/DOS RV, or BASIC PLUS 2/DOS RV with the requisite documentation.

5. SM 52/11 Minicomputer

5.1 Characteristics

The SM 52/11 minicomputer is a high-performance computer system suitable for:

--high output applications in real time,
--multiuser systems and multipurpose applications with time sharing.

The SM 52/11 minicomputer is fully program compatible with the SM 3-20, SM 4-20 and SM 50/50 in asceding direction. It differs from the listed types primarily by:

--an expanded set of instructions,
--higher transmissivity,
--higher speed of processing instructions,
--a system for monitoring of errors,
--potential microprogramming by users,
--programmer panel.

The processor provides for performance of the following instructions:

--basic set of instructions (AS SM 3-20, SM 4-20 or SM 50/50),
--expanded set of instructions EIS (as SM 4-20 or SM 50/50 with 128 K words memory),
--set of arithmetic instructions with floating decimal point (as SM 4-20 with the optional SM 4220 module-processor of floating decimal point),
--instructions for user microprogramming,
--servicing instructions.

The CM 1403 processor of the SM 52/11 computer contains:

--an arithmetic and control unit which performs 139 instructions, including instructions for the floating decimal point, speed of R-R operations performance is in excess of 2 million operations per second, with floating decimal point over one million operations per second,
--memory organizer facilitating use of 128 K words address space,
--CACHE memory of 1 K words capacity which speeds up access to instructions and data stored in the memory,
--programmer panel for direct control, servicing and diagnosing of the system, eventually even for tuning of programs,
--DCS diagnostic control memory which forms the basis of the SM 52/11 computer's diagnostics; it traces errors down to the level of a module, eventually down to the level of an integrated circuit.

Maximum capacity of the computer's internal memory is 128 K words or 256 K syllables; the employed CM 3511 memory of N MOS technology is self-correcting, with correction of single and detection of double error (coinciding with that of the SM 4-20).

The processor operates with protection of memory against access and against entry; it operates in two modes--control and user mode--thus further enhancing the protection of data. The CM 1403 processor facilitates cooperation with the following optional modules.

--the so-called external processor with a floating decimal point, it actually being an accelerator which speeds up performance of executive parts of instructions for the floating decimal point, provided by the CM 1402 processor; space is reserved for this optional module in the processor grid; envisioned availability: 1985.

--the WCS random access control memory for user microprograms, their generation, tuning and loading, built on the basis of RWM technology elements;

--the ECS expansion control memory for storage of fixed microprograms in ROM memories.

Microprograms can be generated and tuned in WCS, run through the programmer (not supplied with the SM 52/11 computer) and these fixed microprograms can be stored on an ECS plate. The WCS or ECS module is placed in the processor into the position in which is located the DCS diagnostic control memory module which is a part of standard equipment; this means that only one of the three control memories--DCS, WCS or ECS--can operate at any given time; envisioned availability: WCS--1985
ECS--1985.

5.2 Basic Configuration of SM 52/11 Minicomputer

1. Box

--processor grid of 7 U height containing:
  --CM 1403 processor itself
  --SM 0205 simple timer
  --SM 0203/C loading module
  --CM 3511 semiconductor working memory storage of 128 K words
  --SM 0211-2 DCS diagnostic control memory
  --CM 5105 control unit of cassette disk memories making it possible to connect up to four CM 5400 cassette disk memory units or the CM 5403 (the CM 5105 control unit will be replaced by the CM 5113 type which makes it possible to connect additional CM 5410 disk units)
  --CM 6002 (ASAD) serial adapter for the CM 7202/S operator's terminal
  --CM 6002 (ASAD) serial adapter for the so-called CM 7108.70 terminal with printer and series interface
--7 U high power feed grid containing the programmer's panel and power feed sources for the processor grid, including a reserve battery module
--CM 5400 basic disk unit
--CM 5400 expansion disk unit.

2. Box

--7 U high expansion grid containing:

  --control unit of magnetic tape memories permitting connection of up to four tape units of the types IZOT 5003, CM 5300, CM 5300.01, CM 5302, CM 5303 or CM 5311 with NRZI recording (this control unit will be replaced by the CM 5012 control unit which makes it possible to also connect the CM 5311 tape unit with PE recording
  --SM 2014 common busbar terminating module
  --power feed source
--CM5302 tape unit
--CM 5605 memory module with floppy disks

Independent devices

--CM 7202/S alphanumeric display terminal
--terminal with printer and series interface formed by the C 2111 dot printer, the C 259 keyboard and a logic box, so-called designation CM 7108.70
--desk for terminal, chair, complete cable connections and accessories.

5.3 Reserves for Additional Expansion of Basic Configuration:

--two free CM 0101 systemic units (for 8 plates) in the expansion grid
--free space for building-in three systemic units into the expansion grid
--free space for emplacement of an external processor with a floating decimal point.

5.4 Supplier Information

The described computer has been in production since 1983 and its production is expected to last till 1987. The SM 52/11 minicomputer will undergo additional development; currently under preparation is a new variant of the processor bearing the designation CM 1403.M1 which facilitates operation with a memory of up to 1 M to 4 M syllables. It is envisioned to become available in 1986. The working designation of this computer is SM 52/11 PLUS or SM 52/11.M1. However, the existing SM 1403 processor does not permit expansion of internal memory beyond 256 K syllables.

5.5 Basic Software

The standard equipment which comes with the basic configuration of the SM 52/11 minicomputer includes the DOS RV 2 operating system with languages MACROASSEMBLER/DOS RV, MICROASSEMBLER, FORTRAN IV/DOS RV and BASIC/DOS RV and one of two optional languages, either FORTRAN IV [PLUS]/DOS RV, or BASIC PLUS 2/DOS RV with the requisite documentation, or some other basic operating system: DIAMS 2, FOBOS@, MARKAB, DOS RV 1 or DOS KP.

A new version of the DOS RV 3 operating system is under preparation for the SM 52/11.M1 computer.

6. SM 50/50 Terminal Station

6.1 Characteristics

The SM 50/50 terminal station is another member of the series of 16-bit SMEP microcomputers operating on the principle of a common busbar.

The SM 50/50 terminal station is intended for

--acquisition, preparation and preprocessing of data,
--scientific and technical calculations,
--use as an office computer.

Its processor provides for performance of the basic set of SMEP INSTRUCTIONS (just as in SM 3-20). The capacity of the SM 50/50 terminal station's internal memory is 32 K words.

6.2 Basic Configuration of SM 50/50 Terminal Station

--Basic unit formed by a display terminal with built-in modules:
  --SM 1110 logic plate of the display terminal proper

--5006 combined module which contains the loading module, serial interface for the operator's terminal itself and a simple timer
--SM 0252 processor plate formed on the basis of 4-bit microprocessor sections
--SM 0451/B semiconductor 32 K words memory of N MOS technology
--SM 1202 quadruple asynchronous adapter QASAD of CM 1601 display terminals (the so-called terminal version)
--CM 6001 parallel adapter PAD 8 for connection of printer with PRPR interface
--SM 0602 interconnecting plate for connection of a control unit of floppy disk memory
--CM 5605 floppy disk memory in desk-top finish
--accessories, cable connections, cable for connection of printer with IRPR interface and four cables for connection of CM 1601 display terminals, power feed sources, two desk units for the basic unit and for the disk memory.

Reserves for Expansion

The following can be connected to the SM 50/50 terminal station:

--four type CM 1601 display terminals with IRPS interface,
--one printer with parallel IRPR interface.

Additional expansion is not possible at the present time because of the grid which has eight positions. In about 1985 it will become possible to equip the terminal station by one SM 1207 (SAD B) or SM 1208 (SAD D) communication adapter.

6.4 Supplier Information

The SM 50/50 terminal station has been produced in this version since 1983.

Work is currently underway on development of a new CM 1628.M1 processor which will allow expansion of internal memory up to 2 M syllables. It is expected to become available after 1987. The designation of this computer is SM 50/50.M1.

6.5 Basic Software

With the SM 50/50 terminal station of 32 K word memory comes the FOBOS 2 operating system with languages MACROASSEMBLER/FOBOS, FORTRAN IV/FOBOS and BASIC/FOBOS with the requisite documentation.

Additional expansion software can be obtained through special orders, e.g., the PPPD 1 data acquisition system.

7. Envisaged Development

In addition to the already mentioned variants of the SM 52/11 and SM 50/50 computers undergoing development, work is starting on the development of an

additional computer operating on the principle of a common busbar with a 32 bit architecture. Its designation is SM 52/12 and its marketing is envisioned for the end of the next 5-year plan.

8. Optional Processor Devices

SACK Auxiliary Circuits Plate

only for the SM 3-20 computer up to production number 240; it is a 1/3 plate which is connected to the common busbar into the processor grid; it improves the functioning of the SM 3-20 computer; from production number 240 it came with basic configuration.
Specification for ordering: SACK plate.

CM 31-3 Ferritic Memory

with 32 K word capacity for the SM 3-20, or 64 K words for the SM 4-20, is intended for replacing existing semiconductor memories in cases where the contents of the working memory storage must not be lost during protracted voltage outages.
Specifications for ordering: CM 3103--32 K words or CM 3103--64 K words.

Programmer Panel

is standard equipment in the SM 52/11 computer configuration; it is not provided for any other type of computer, neither independently nor as an optional module; this co-called servicing programmer's panel is intended for the servicing of computers and can be ordered independently from ZVT Namestovo (see sub Testers).

SM 4220

processor with floating decimal point FPP-SM 4220 is an optional module expanding the potential of the CM 2401 processor of the SM 4-20 computer, permitting operation with floating decimal point in simple and double accuracy.
Specification for ordering: CM 5605

9. Expansion Hardware

Unless otherwise specified, these devices are estimated to be available in 1984.

Disk Memories, Disk Units

CM 5605-set

subsystem of magnetic floppy disk memory containing a control unit and two type MOMFLEX 6400 or CONSUL 7113 disk units with a total capacity of 0.5 M syllables, the disk unit uses one side of the floppy disk, data are organized into 77 storage tracks with 26 sectors for 128 syllables each;

medium: standard floppy disk meeting ISO TC 97/SC-11;
the set contains a 7 U high 19" module installed into a free position in the box, the requisite cable connections and installation components are a part of the set.
Specification for ordering: CM 5605

CM 5626-set

for information only: floppy disk memory with double capacity is analogous to the CM 5605, but with selectable single or double density; total capacity then amounts to 0.5 M syllables or 1 M syllables.
Expected availability: 1985.

CM 5400 expansion

unit expanding cassette disk memory with a capacity of 5 M syllables (CM 5400.00/12 A--producer IZOT Bulgaria);
medium: 12-sector exchangeable top-loaded cassette disk of the type EC 5269.01 (IBM 5440) with 2.5 M syllable capacity;
the disk unit forms an independent 19" module 6 U in height mounted into a free position in the box.
Specification for ordering: CM 5400.00/12/A;
for connection and installation a separate order must be made:
--installation parts CM 5400 - 8XK 150 212.

CM 5403 expansion

unit expanding cassette disk memories with a capacity of 5 M syllables (KDP 723--producer Zbrojovka Brno);
medium: 12-sector exchangeable cassette disk type BASF 631 (IBM 2315) with front loading;
the disk unit forms one 19" module 7 U high; the module is mounted into free positions in the box;
for connection and installation it is necessary to order separately
--OXF 642 098 cable
--CM 5403 installation parts.

CM 5410

for information only: an innovated variant of the CM 5400 disk--differing only by its double capacity, i.e., 10 M syllables--is in preparation; the CM 5410 disk unit must be connected via the CM 5113 control unit which is in preparation; for connection and installation a separate order must be made for:
--CM 5410 installation parts.
Expected availability: 1985.

CM 5405

29 M syllable large-capacity disk memory; it contains two independent disk units of the type EC 5061 C, each with 29 M syllable capacity in box variant

and an independent 19" box with a control unit and power feed sources (in the box remains 15 U high space for building in additional 19" modules); network power feed in three-phase 3 x 380 V;
medium: EC 5261.01 type 20-surface disk bundle;
depending on the number and size of the built-in grids, a special order must be made for covering panels to cover the free space in the box up to the total height of 32 U (see below);
for connection and installation a separate order must be made for:
--8 XF 641 053 040 common busbar cable, 4 m long
--cover by covering panels.
Specification for ordering: CM 5405

Large-capacity 100 M syllable disk memory

for information only: the large-capacity disk memory subsystem contains an all-purpose control unit of domestic production facilitating the connection of up to four 100 M syllable disk units and two 100 M syllable disk units of the EC 5080 type (Aritma), EC 5066 (USSR) or 5767.02 (Bulgaria). The control unit provides for all standard functions, including identification of bursts of errors of up to 11 bits in one sector. It operates with 512 syllable fixed sectors. The control unit forms structurally a double systemic block and is placed into a standard 19" grid 7 U high. The disk units form independent boxes.
Anticipated availability: 1986.

Tape Units

IZOT 5003

CM 5300

for information only; tape units which are no longer supplied and were replaced by the newer CM 5300.01 type.

CM 5300.01

external memory with standard 9-track magnetic tape used as a basic or an expansion tape unit for a computer; maximum reel diameter 216 mm, recording density 32 bit/mm, transmission speed 10 K syllables/sec; the tape memory forms an independent module 7 U high which is mounted into a free position in the box.
Specification for ordering: CM 5300.01;
for connection and installation a separate order must be made for:
MPP CM 5300.01 cable 8XF 641 229 - 8XF 881 085.

CM 5302

external memory with standard 9-track magnetic tape used as a basic and an expansion tape unit for a computer; maximum reel diameter 267 mm, recording density 32 bits/min, transmission speed 20 K syllables/sec; the tape unit forms an independent module 14 U high which is mounted into a free position in the box.

Specification for ordering: CM 5302;
for connection and installation a separate order must be made for:
--MPP 5302 cable - 8XF 641 247.

CM 5303

external memory with standard 9-track magnetic tape used as a basic and an expansion tape unit for a computer; maximum reel diameter 267 mm, recording density 32 bits/min, transmission speed 36 K syllables/sec; the tape unit forms an independent module 15 U high which is mounted into a free position in the box.
Specification for ordering: CM 5303;
for connection and installation a separate order must be made for:
--MPP CM 5303 cable - 8XF 641 247

CM 5311

for information only: the MMP 45 tape unit undergoing preparation for domestic production will have a change-over density of 32 or 64 bits/mm, maximum reel diameter 267 mm, maximum transmission speed 36 K syllables/sec, a new CM 5012 control unit, also under preparation with NRZI recording (density 32 bits/mm) as well as PE (density 64 bits/mm) will make it possible to connect up to four of these tape units with either density switched over by the program.
Expected availability: 1985

Input/Output and Communication Systems

CM 7202/P

alphanumeric display terminal with parallel IRPR interface; screen capacity 1,920 symbols, i.e., 24 lines x 80 symbols, maximum transmission speed 150 K syllables/s; it is possible to connect to the terminal a printer with parallel IRPR interface for printout of screen contents; a desk for supporting the terminal is not standard equipment.

Specification for ordering: CM 7202/P;
for connection a separate order must be made for:
--CM 6001 (PAD 8) parallel adapter
--8XF 641 005 IRPR IN cable
--8XF 641 054 IRPR OUT cable.

CM 7202/S

alphanumeric display terminal with in-series IRPS interface--current loop with S2 interface meeting V.24 CCITT recommendation; maximum transmission speed 9,600 bit/s; it is connected to a computer by one of the following communication units:
--CM 6002 (ASAD) asynchronous adapter,
--CM 8511 (AMU) asynchronous multiplex,
--CM 8512 (QASAD) quadruple adapter;

depending on the choice of communication unit, the type of interface and the distance of terminal connection, a special order must be made, in accordance with the tables listed below, for the requisite cable connections; neither the communication units nor the cables are standard equipment; a desk for supporting the terminal also is not standard equipment;
it is possible to connect to the terminal a printer with IRPR interface for printout of the screen contents.
Specification for ordering: CM 7202/S

CM 1601

alphanumeric display terminal with serial IRPS interface, current loop or IRPS current loop and S2 interface meeting the V.24 CCITT recommendation; format of symbols displayable on the screen is 16 lines x 64 symbols, transmission speed 600 and 9,600 bits/sec; it is connected to the computer similarly to the SM 7202/S terminal; communication units and cables are not standard equipment; neither is the desk for supporting the terminal.
The CM 1601 does not permit the connection of a printer with an interface for printout of the screen contents.
Specification for ordering: CM 1601/IRPS (current loop interface)
CM 1601/IRPS + S2 (current loop interface and S2)

CM 7202.M1-A

modernized version of the CM 7202 alphanumeric display terminal, symbols in 7 x 7 points raster, format of symbols displayable on screen is 24 lines x 80 symbols, connection to a computer coincides with the CM 7202/S.
Specification for ordering: CM 7202.M1-A

CM 7202.M1-G

for information only: semigraphic display terminal facilitating display of graphic functions or histograms in a 512 x 236 raster; it is actually an expanded version of the CM 7202.M1-A terminal, connection to a computer coincides with the method for connecting the CM 7202/S.
Anticipated availability: 1984-5

SM 1106-S

IO-S plate bearing the designation SM 1106-S, providing series interface in the CM 7202/S display terminals, is a part of their standard equipment; in a case when the plate providing parallel IRPR interface in the CM 7202/P terminal, designated IO-P = SM 1101-P, the CM 7202/S terminal becomes a CM 7202/P terminal.
Specification for ordering: SM 11006-F

SM 1101-P

IO-P plate bearing the designation SM 1101-P provides parallel interface in the CM 7202/P display terminal; substitution of this plate by SM 1106-S in the CM 7202/S terminal makes the latter into a CM 7202/P terminal.
Specification for ordering: SM 1106-F
SM 1101-B

CM 7405

The CM 7405 graphic vector terminal facilitates the interactive processing of graphic information; the terminal can contain a graphic processor, a graphic monitor with light pen and the CM 7202 console and the relevant control units; screen raster is 1,024 x 1,024 points, IRPS interface; its connection to a computer calls for one open channel with an IRPS (ASAD, AMU, QASAD) interface.
Specification for ordering:
1. GVM 01 graphic vector monitor,
2. graphic processor,
3. CM 7202 console terminal.

The GVM 01 graphic vector monitor is an independent device for desk-top use, the graphic processor is designed as a special systemic unit and is placed into a standard 19" grid.

CM 7108.43

a terminal with printer in console design with parallel IRPR interface, containing the type CONSUL 2113 dot printer and keyboard, transmission speed 100-300 bits/sec, 132 symbols per line, maximum printing speed 154 symbols/sec.
Specification for ordering: CM 7108.43;
for connection a separate order must be made for:
--CM 6001 (PAD 8) parallel adapter.
--UPK 1 cable 8XF 641 034,
--UPK 2 cable 8XF 641 035.

CM 7108.61

variant of the CM 7198 terminal with S2 series interface meeting the V.24 CCITT recommendation, connected to a computer similarly to the CM 7202/S; communication units are not part of standard equipment; cables must be ordered separately in accordance with the tables listed below.
Specification for ordering: CM 7108.61

CM 7108.63

variant of the CM 7108 terminal with series IRPS current loop interface, connected to a computer similarly to the CM 7202/S; communication units are not part of standard equipment; cables must be ordered separately in accordance with the tables listed below.
Specification for ordering: CM 7108.63

CM 6301

Robotron 1156 dot printer in console design with IRPR parallel interface, printing speed 100 symbols/sec, 178 symbols per line;
for connection a separate order must be made for:
--CM 6001 (PAD 8) parallel adapter,
--8XF 641 110 DARO cable.
Notice: no more available in 1984.

CM 6309/P

Robotron 1157 dot printer with IRPR parallel interface in console design with printing speed of 180 symbols/sec, 132 symbols per line, desk supporting the printer is not part of standard equipment.
Specification for ordering: Robotron 1157/P;
connection calls for ordering:
--CM 6001 (PAD 8) parallel adapter,
--Robotron 1157/P cable.

CM 6309/S

Robotron 1157 dot printer in console design with IRPS serial interface, connected to a computer similarly to terminals with serial interface; neither communication units nor cables are a part of standard equipment; depending on the choice of communication unit and the distance for printer connection, the requisite cable connections must be ordered separately in accordance with the tables listed below.
Specification for ordering: Robotron 1157/S.

CM 6317/P

Robotron 1152 type 251 daisy-wheel printer with IRPR parallel interface prints at a maximum speed of 40 symbols/sec, with switch-over print density it accommodates 132 or 158 symbols per line, desk supporting the printer is not part of standard equipment.
Specification for ordering: Robotron 1152/P;
for connection a separate order must be made for:
--CM 6001 (PAD 8) parallel adapter,
--Robotron 1152/P cable.

CM 6317/S

Robotron 1152 daisy-wheel printer in console design with serial IRPS current loop interface, connected to a computer similarly to terminals with serial interface, neither communication units nor cable are part of standard equipment; depending on the choice of communication unit and the distance of printer connection, the requisite cable connections must be ordered separately in accordance with the tables listed below.
Specification for ordering: Robotron 1152/S.

Hard Copy Printer

dot printer with IRPR parallel interface; can be used for printout of screen contents of the CM 7302 terminal;
connection to the CM 7202 terminal calls for ordering:
--DISPEJ-DARO connector reduction, order no 8XF 881 201,
--Robotron 1157/P or 1152/P cable.

CM 6313

VIDEOTON 270 90 line printer with IRPR parallel interface, printing speed 900 lines per minute, 136 symbols per line.
Specification for ordering: VT 270 90/SMEP;
connection calls for separate ordering of:
CM 6001 (PAD 8) parallel adapter,
--8XF 881 087-VT 270 90 cable.

CM 6311

line printer with IRPR parallel interface, printing speed 300 lines/min, 136 symbols per line.
Specification for ordering: Videoton 230 30/SMEP;
connection calls for special order of:
--CM 6001 (PAD 8) parallel adapter, order no 8XK 050 015,
--VT 230 30 cable.

EC 6112 Set

is a set of the ARITMA 2050-EC 6112 punch card reader with PAD 12-SM 0706 control unit; reading speed 300 cards/min; the set includes the EC 6112 reader, the control unit, a desk and interconnecting cables.
Specification for ordering: 8XN 280 464

CM 9004/A

control unit for connection of JSP-DASIO unit for interface with medium for address mode (JSP DASIO-CM 9101 supplied by METRA Blansko); the set includes two 2/3 plates and an interconnecting plate and calls for two free positions in the CM 0101 systemic unit, the cable for connection of DASIO 600 is not part of standard equipment.
Specification for ordering: 8XN 050 036

CM 9004/B

control unit for connection of JSP-DASIO unit for interface with medium for cyclically interrupted mode (JSP DASIO-CM 9101, supplied by METRA Blansko); the set contains two 2/3 plates and an interconnecting plate and calls for two free positions in the CM 0101 systemic unit, cable for connection of DASIO 600 is not part of standard equipment.
specification for ordering: 8XN 050 037

CM 9004/C

control unit for connection of the JSO-DASIO unit for interface with medium for DMA mode (JSP DASIO-CM 9101, supplied by METRA Blansko); the set contains two 2/3 plates and an interconnecting plate and calls for two free positions in the CM 0101 systemic unit, cable for connection of DASIO is not part of standard equipment.
Specification for ordering: 8XN 050 038

CM 9205

LJSP laboratory unit for interface with medium; the set includes two 2/3 plates, a distribution panel, testing and interconnecting plates and cables; it calls for two free positions in the CM 0101 systemic unit.
Specification for ordering: 8XN 050 039.

CM 0102

control unit for connection of the JSM 2 measuring system with the IEE 466 busbar; the set contains two 2/3 plates, an interconnecting plate and the IMS 2 cable terminated by the ELTRA plug and one ELTRA socket; it calls for two free positions in the CM 0101 systemic unit.
Specification for ordering: 8XN 090 020.

CM 6001

parallel 8-bit adapter (PAD 8) for connection of devices with IRPR parallel interface, maximum connecting distance 15 meters; it takes up one 2/3 position in the CM 0101 systemic unit;
connector employed on plate: two units of 30-pole FRB - TY 513 3011.
Specification for ordering: 8XK 050 015.

SM 0708

parallel 16-bit adapter (PAD 16) for connection of graphic peripheries (BAK 5T analog recorder with DIGIBAK converter, DIGIGRAF drafting desk, digitizer, etc.); it takes up one 2/3 position in the CM 0101 systemic unit;
connector employed on plate: two units of 30-pole FRB - TY 513 3011.
Specification for ordering: 8XK 052 042.

CM 6002

series asynchronous adapter (ASAD) for connection of peripheral equipment with IRPS serial asynchronous interface or for connection to a modem with S2 interface meeting the V.24 CCITT recommendation, transmission speed 50 to 9,600 bits/sec, number of bits 5-8, odd or even parity control or without control, distance for connection with interface:
--IRPS with four-wire current loop up to 500 m,
--S2 via modem, e.g., via telephone network, to unlimited distance.
The CM 6002 takes up one 2/3 position in the CM 0101 systemic unit;
connector employed on plate: 2 units of 30-pole FRB - TY 513 3011;
the adapter does not include cables for connection of individual terminals or modems and they must be ordered separately in accordance with the tables listed below.
Specification for ordering: 8XK 050 024.

CM 8511/A, B, C, D, E, F, G Multiplex

The AMU A, B, C, D, E, F, G asynchronous multiplex facilitates the connection of up to 8 or 16 terminals with interfaces either IRPS current loop or S2 in

commutated network or fixed lines according to the V.24 CCITT recommendation depending on the subsequently described variants;
a multiplex for 8 lines contains: a systemic unit, two electronics plates (2/3 + 3/3), a distribution panel for eight lines, cable connection multiplex-distribution panel; the remaining two positions of the systemic unit can be used for any random module; expansion of the multiplex from 8 to 16 lines includes two additional electronic plates and a distribution panel for the additional eight lines; the distribution panels with IRPS interface have terminal boxes for connection of lines, the distribution panels with S2 interface use ELTRA connectors; the systemic unit with multiplex is placed into a free position in the expansion grid of the computer's basic configuration, the distribution panel is mounted on the rear wall of the box; cables for the connection of individual terminals or modems are not standard equipment and must be ordered separately in accordance with the tables listed below.

CM 8511/A Multiplex

makes it possible to connect up to eight lines with S2 interface.
Specification for ordering: 8XN 090 033;
to ensure functioning, an additional order must be made for:
--SM 2016 plate, order no 8XK 050 020, two units.

CM 8511/B Multiplex Expansion

expands the possibilities of the CM 8511/A or CM 8511/C multiplex and permits the connection of eight additional lines with S2 interface.
Specification for ordering: 8XN 090 035.

CM 8511/C Multiplex

facilitates the connection of up to eight lines with IRPS-current loop interface.
Specification for ordering: 8XN 090 037;
to ensure functioning, an additional order must be made for:
--SM 2016 plate, order no 8XK 050 020, two units.

CM 8511/D Multiplex Expansion

expands the possibilities of the CM 8511/C or CM 8511/A multiplex and connection of eight additional lines with IRPS-current loop interface.
Specification for ordering: 8XN 090 039.

CM 8511/E Multiplex

facilitates connection of up to 16 lines with S2 interface (includes CM 8511/A + CM 8511/B).
Specification for ordering: 8XN 090 041.

CM 8511/F Multiplex

permits connection of up to 16 lines with IRPS interface (contains CM 8511/C + CM 8511/D).
Specification for ordering: 8XN 090 043).

CM 8511/G Multiplex

makes it possible to connect up to eight lines with IRPS interface and eight lines with S2 interface (contains CM 8511/A + CM 8511/D).
Specification for ordering: 8XN 090 045.

CM 8105

zero modem--a simple interconnection module for local connection of systems with S2 interface (without modem) up to a distance of 15 m; expands utilization of the CM 8511 multiplex with S2 interface meeting the V.24 CCITT recommendation or is used for testing of the terminal network with local connection.
Specification for ordering: 8XK 080 046.

CM 8512/A, B, C, D, E for Box Design

QASAD quadruple asynchronous adapter for connection of four lines with either an IRPS-current loop or S2 interface meeting the V.25 CCITT recommendation, for fixed lines only, in random combination;
cables for connection of individual terminals or modes are not part of standard equipment and must be ordered separately in accordance with the tables listed below; the QASAD takes up one 2/3 position in the systemic unit.

CM 8512/A

variant of the QASAD asynchronous adapter
4 x IRPS.
Specification for ordering: 8XN 280 250.

CM 8512/B

variant of the QASAD1 asynchronous adapter
4 X S2.
Specification for ordering: 8XN 280 251.

CM 8512/C

variant of the QASAD asynchronous adapter
2 x IRPS + 2 x S2.
Specification for ordering: 8XN 280 252.

CM 8512/D

variant of the QASAD asynchronous adapter
3 x IRPS + 1 x S2.
Specification for ordering: 8XN 280 253.

CM 8512/E

variant of the QASAD asynchronous multiplex
1 x IRPS + 3 x S2.
Specification for ordering: 8XN 280 254.

CM 8506

SAD series asynchronous adapter for connection with another 16-bit SMEP computer system; routines HDLC, SDLC, DDCMP, backed up by cyclic code CRC-16 or CRC-CCITT, S2 interface according to V.24, V.28 CCITT recommendations, maximum transmission speed 9,600 bits/sec; the BCS procedure can also be used with additional program support (for connection, e.g., with EC 1025, EC 1026); a cable for connection of the MDS 1200 modem, the adapter takes up one 2/3 position in the systemic unit.
Specification for ordering: 8XN 280 062.

SM 1207

for information only: the SAD B serial synchronous adapter facilitates the connection of a computer with some other computer system with synchronous BSC interface (e.g., the EC 1025 or EC 1026 with the KOM communication module), maximum speed 9,600 bits per second, backed up by cyclic code, the set contains an SM 1207 adapter and a cable for connection of the MDS 1200 modem; the adapter takes up one 2/3 position in the systemic unit.
Specification for ordering: 8XN 280 098.
Anticipated availability: 1985.

SM 1208

for information only: the SAD D series synchronous adapter facilitates the connection of a computer with another SMEP computer within the generation of homogeneous SMEP computer networks, DDCMP procedure, backing up by cyclic code, the set contains an SM 1208 adapter and a cable of modem connection; the adapter takes up one 2/3 position in the systemic unit.
Specification for ordering: 8XN 280 541.
Anticipated availability: 1985.

KOMPRO Communication Processor

for information only: the auxiliary processor for control of the communication subsystem makes a computer's operation faster and more effective. It can control a maximum of 6 asynchronous multiplexes or 16 synchronous adapters. It is structurally formed by two plates (2/3 and 3/3) and is located in the systemic unit.
Specification for ordering: 8XN 090 101.
Anticipated availability: 1986.

Structural and Systemic Elements

CM 4103-Short

common busbar repeater-for cases when the physical length of a common busbar is inadequate, or the total number of connections to the common busbar exceeds 18; the short variant of 0.25 m in length is intended for interconnection of adjacent systemic units in one grid.
Specification for ordering: 8XF 646 115.

Common Busbar Switch

for information only: the common busbar switch makes it possible to keep two computer systems in reserve, or successive connection of one or more peripheral systems to the common busbar of one or the other computer either manually or by program. The switch is located in a 7 U high grid where there also is room to accommodate control units of systems connected to the switched on common busbar.
Specification for ordering: 8XN 280 564.
Anticipated availability: 1985.

Interprocessor Connection Module

for information only: it facilitates interprocessor connection between two computer systems on the basis of direct memory access (DMA) via a common busbar; maximum capacity of a transmitted block is 32 K syllables, it takes up one 2/3 position in the CM 0101 systemic unit.
Specification for ordering: 8XK 052 260.
Anticipated availability: 1985.

SM 2014

terminating module for a common busbar is a 1/3 plate which is a part of all SMEP computers with a common busbar; it finds independent application in grids used for expansion of the existing configuration of other computers operating with a compatible busbar (e.g., UNIBUS).
Specification for ordering: 8XK 050 019.

SM 2016

interconnecting 1/3 plate (GRANT) for filling in free positions in the systemic unit.
Specification for ordering: 8XK 050 020.

CM 0101

systemic unit--connector plate for four plate positions intended for building into a grid, a maximum of two plates can be of size 3/3, the remainder, up to four, can be of size 2/3; unused positions up to a total number of four plates must be supplemented by SM 2016 interconnecting plates.
Specification for ordering: 8XF 846 062;
one short SZ cable, order no 8XF 641 053 0025, must be ordered for the CM 0101 to function.

SZ Short Cable

the short SZ common busbar interconnecting cable is intended for connection of the CM 0101 systemic unit to the existing systemic units in the expansion grid, length is 0.25 m;
it must be ordered separately only for each CM 0101 systemic unit ordered and in a case when the user wants to utilize a free systemic unit that is part of standard equipment in the grid of the SM 3-20 or SM 4-20 processor.
Specification for ordering: 8XF 641 053 0025.

SZ Long Cable

the SZ long common busbar interconnecting cable is intended for connection of the CM 5405 disk memory with a computer, length 4 m.
Specification for ordering: 8XF 641 053 040.

Box

basic 19" box for installation of various SMEP expansion modules contains ventilation systems, a distribution block, accessories;
OCEL steel box permits building in of up to 33 U high modules, the ALMEZ aluminum box of up to 32 U high, length of the power cable is 10 m.
Specification for ordering: ALMEZ box: 8XK 150 006
OCEL box: 8XN 280 058

Box 160

variant of the ALMEZ box for SMEP expansion modules, box configuration includes the basic box, installation parts for CM 6204 and CM 5400, double set of 3 U high cover panel, one set of 7 U high cover panel.
Specification for ordering: 8XN 280 160.
Note: not supplied as of 1984, new configurations are to use box 8XK 150 006 or 8XN 280 058.

Box 168

variant of the ALMEZ box for SMEP expansion modules, box configuration contains the basic box, an expansion grid, installation parts for CM 5400, two sets of 2 U high cover panel, three sets of 7 U high cover panel.
Specification for ordering: 8XN 280 168/ALMEZ.
Note: not supplied as of 1984, new configurations are to use box 8XK 150 006 or 8XN 280 058 and the expansion grid 8XN 280 173.

2 U Covering Panel Set

The 2 U covering panel set is intended for the covering of free unused positions in the box that are not taken up by grids or expansion devices in grid form, containing the panel itself and the requisite installation elements.
Specification for ordering: 8XK 150 209.

3 U Covering Panel Set

The 3 U covering panel set is intended for covering free unused positions in the box that are not taken up by grids or expansion devices in grid form; it contains the panel itself and the requisite installation elements. Specification for ordering: 8XK 150 210.

7 U Covering Panel Set

The 7 U covering panel set is intended for the covering free unused positions in the box that are not taken up by grids or extension devices in grid form; it contains the panel itself and the requisite installation elements. Specification for ordering: 8XK 150 211.

Two-Layer Extension Plates

A set of extension plates is needed when servicing is provided by the user; the set contains the following plates:
--single-connector plate (1/3), order no 8XK 651 091,
--twin-connector plate (2/3), order no 8XK 651 090,
--triple-connector plate (3/3), order no 8XF 651 089.

Four-Layer Extension Plates

A set of four-layer extension plates is needed when servicing is provided by the user; the set contains the following plates:
--single-connector plate (1/3), order No NX 010.00-001,
--twin-connector plate (2/3), order No NX 009.00-001,
--triple-connector plate (3/3), order No NX 008.00-001.

10. Cables for Connection of Terminals and Devices With Serial Interface

A. Cables for connection in local mode up to 15 m, IRPS interface--current loop

Table 1 shows the order number of cables for connection of the specified terminals and devices with a serial interface to a communication unit. For each connection or each terminal in local mode one of the cables specified must be provided; maximum cable length is 15 m.

Table 1

Terminal or device with serial interface	Communication unit employed		
	ASAD CM 6002	AMU/IRPS CM 8511	QASAD/ IRPS CM 8512
CM 1601, 7202.M1-G CM 1601, 7202.M1-G	8XF 641 037	8XF 641 144	8XF 641 144
CM 7108.63	IRPS 12	IRPS 10	IRPS 10
CM 6309/S, CM 6317/S	IRPS 13	IRPS 11	IRPS 11

B. Cables for Connection Up to 500 m Distance With IRPS Interface-Current Loop

Connection is provided by means of the user's own distribution connected at both ends by terminal boxes; this distribution--including the terminal boxes--is procured by the user prior to the installation of the computer; the resistance of one IRPS interface loop must be lower than or equal to 100 ohms. The maximum total length of the line from the communication unit to the terminal's connector is 500 m. Most suitable is a cable with two pairs of twisted conductors, e.g., the PR 4-22 cord.

Table 2 shows the order number of designation of the needed cables. If connection is to be done by means of the mentioned user's distribution, both of the listed cable are needed--one on the computer side from the communication unit to the terminal box and the second on the part of the remote device from the terminal box to the terminal or system; the cables are 10 m long.

Table 2

Terminal or device with serial interface	Communication unit employed		
	ASAD CM 6002	AMU/IRPS CM 8511	QASAD/ IRPS CM 8512
CM 7202/S, CM 7202.M1-A CM 7202/S, CM 7202.M1-A	8XF 641 002 8XF 641 144	8XF 881 092 8XF 641 144	8XF 881 092 8XF 641 144
CM 7108.63	8XF 641 002 IRPS 10	8XF 881 092 IRPS 10	8XF 881 092 IRPS 10
CM 6309/S, CM 6317/S	8XF 641 002 IRPS 11	8XF 881 092 IRPS 11	8XF 881 092 IRPS 11

C. Cables for Connection of Devices With S2 Interface Meeting the V.24 CCITT Recommendation

The distance over which the mentioned terminals and devices with S2 interface can be connected is not limited.

The transmission circuit, termination by modems at both ends are procured by the user prior to the installation of the computer. The MDS 200 and MDS 1200 modems are available exclusively from telecommunications organizations.

Table shows the order numbers of cables; the connection of each terminal calls for both cables: one on the computer side from the communication unit to the modem and the second on the side of the remote devide from the modem to the terminal. Cable length is 10 m.

For testing purposes or for the connection of devices with S2 interface up to 15 m, the transmission circuit terminated at both ends by modems can be replaced by the CM 8105 zero modem.

Table 3

Terminal	Communication unit employed		
	ASAD CM 6002	AMU/S2 CM 8511	QASAD/S2 CM 8512
CM 7202/S, CM 7202.M1-A CM 1601, CM 7202.M1-G	8XF 641 006 8XF 641 055	8XF 641 055 8XF 641 055	8XF 641 125 8XF 641 055
CM 7108.61	8XF 641 006 MODEM 10	8XF 641 055 MODEM 10	8XF 641 125 MODEM 10

11. Software

In the parentheses following the software titles are listed the types of computers for which the software is suitable.

FOBOS 1 (SM 3-20, SM 50/50)

The FOBOS 1 is a single-user operating system suitable in single or double program mode in real time, and for processing tasks in batches. It contains control programs, translators of MICROASSEMBLER, FORTRAN/FOBOS, BASIC/FOBOS as well as service and auxiliary programs. The operating system can be supplemented by a library of subprograms for scientific and technical calculations in the FORTRAN IV/FOBOS language. A COBOL/FOBOS translator can be obtained through special order. In the course of 1983 this operating system was replaced by the new version FOBOS 2. The operating system also supports the following application-oriented software:
--IMS 2-set of programs to support operation of an integrated measuring system;
--cross-reference software for SM 50/40, permitting generation and tuning of programs for the SM 50/40 microcomputer system.

FOBOS 2 (SM 3-20, SM 50/50, SM 4-20, SM 52/11)

This operating system for interactive generation of programs, applications in real time, and batch processing, differs from the FOBOS 1 operating system in its innovated structure and the fact that it can operate with a working memory storage of up to 128 K words. It contains translators of MACROASSEMBLER/FOBOS, FORTRAN IV/FOBOS and BASIC/FOBOS. It includes the XM expansion monitor, which provides expanded potential for connection of up to eight terminals.

VU BASIC (SM 3-20)

This interpretive software type facilitates simultaneous operation by up to eight users in radially connected terminal network in BASIC under control of the FOBOS operating system. Access to sets is protected against misuse by an unauthorized user.

PPPD 1 (SM 3-20, SM 50/50)

This system for preparation, preprocessing and transmission of data is an acquisition system intended for the preparation and preprocessing of data from up to eight CM 7202 terminals with an integrated numerical keyboard and potential conversion of data into a code and format suitable for further processing on a JSEP computer.

The series of the PPPD 1 system's standard programs facilitates:

--simple adaptation of a specific hardware configuration during generation which progresses in the form of a dialogue with the system programmer,
--password protection against misuse or unauthorized access,
--keeping of statistics about operation,
--operation with various types of formats with and without heading,
--guidance of operator during actual data acquisition, carrying out formal control of the correctness of data, formatting with headings and running lines, storage of data onto a disk,
--locating a sentence in a batch during updating of previously generated data and correcting its contents, inserting new sentences and deleting data,
--verifying data by reinsertion and comparison with the original set of data,
--combining batches of data,
--performing control printouts of data in various formats,
--copying data from a disk onto magnetic tape and carrying out transformation of ASCII-EBCDIC codes in a format suitable for processing on individual types of JSEP computers, etc.

In case of additional requirements, every user can develop or modify the system at random.

GOLEM 3 (SM 3-20)

A system similar to the PPPD 1 that facilitates the operation of up to 6 display terminals.

VYUKA (SM 3-20)

The VYUKA operating system for the area of educational and training processes facilitates the simultaneous operation of up to eight users, i.e., students and an instructor. It consists of a monitor and service programs, the VU BASIC language, applicational and demonstration programs for programmed instruction with the aid of texts.

DOS RV 2 (SM 3-20, SM 4-20, SM 52/11, SM 50/50 With 128 K word memory)

The DOS RV 2 is a multiprogram, event-controlled real time operating system. The system permits independent or combined processing of tasks of high priority in real time with a necessarily fast response to external events with less urgent, yet considerably voluminous tasks in multiprogram mode with time sharing. Up to 250 priority levels can be defined by programs.

The method of memory assignment, fast cooperation with external disk memory, dynamic compression of memory and a system of priorities provide for highly efficient processing of tasks. The system is protected against misuse by an unauthorized person, individual sets also being protected. Languages: MACROASSEMBLER/DOS RV, MICROASSEMBLER (in the case of SM 52/11), FORTRAN IV/DOS RV, FORTRAN IV PLUS/DOS RV, COBOL/DOS RV, BASIC PLUS 2/DOS RV, whereby the COBOL/ROS RV language requires the subsequently listed RSZ system.

The operating system also supports the following goal-oriented software:

--RSZ system for operation with entry-oriented data sets with sequential, relative or index organization,
--DTS interactive query system for manipulation, selection and printout of data of entry-oriented sets,
--SORT program for sorting of entry-oriented sets,
--SYRPOS 1 system for control of computer and terminal networks based on SMEP minicomputers (SM 52/11, SM 4-20, SM 50/50, SM 3-20) provide for communication between computers and terminals, remote processing and control of tasks, manipulation with sets and access to remote sets, etc.,
--MTD set of programs for generation of magnetic tape in ASCII or EBCDIC code in any random format of other computers (JSEP, IDM, SIEMENS, etc.),
--set of programs for scientific and technical calculations,
--DASIO operating device for supporting the operation of the DASIO control unit
--LJSP operating device for supporting the operation of the LJSP control unit for interface with the medium,
--compiler from COBOL language,
--software for support of graphics (SM GRAF, PLOT),
--translator from POP language
--GOLEM 4.

Other expansion software is in preparation, e.g., the EC 7921 interactive emulation routine or the EC 8514 batch emulation routine for connection with JSEP, the PRENOS program for connection with the SM 50/40 microcomputer, etc.

The data base system being developed for operation under the DOS RV 2 control is not available for the time being.

DIAMS 1 (SM 3-20, SM 50/50, SM 4-20, SM 52/11)

DIAMS 1 is an operating system facilitating the administration of a simple data base with an interpreter of the input program language MUMPS. MUMPS is text-oriented, allows text operations such as, e.g., identification of certain contents of a text, changes in format, combination of texts.

The operating systems provides protection for sets, maximum number of users is 40.

DIAMS 2 (SM 50/50 with 128 K word memory, SM 4-20, SM 52/11)

The DIAMS 2 operating system is considerably improved over the DIAMS 1 with innovation of the programming language and the system's structure. This version can serve up to 63 users. It employs the STANDARD MUMPS language.

DOS RVR 1 (SM 4-20, SM 52/11, SM 50/50 with 128 K word memory)

The DOS RVR 1 is the most effective operating system for handling tasks in the area of mass data processing. The basic mode of this operating system from the viewpoint of users is conversational communication for 24 independent users, handling tasks from its terminals through an interactive mode with time sharing in the BASIC PLUS/DOS RVR programming language. The latter language can be used for completing programs in the COBOL/DOS RVR language.

The sets of individual systems can be protected against unauthorized entry and reading.

MARKAB (PPPD 2) (SM 4-20, SM 52/11, SM 50/50 with 128 K word memory)

This user-oriented software facilitates the acquisition of data from as many as 32 terminals, provides all the requisite formatting, arithmetic and logic controls, connecting, sorting, printing and conversion functions, keeping of operational statistics, permits the acquisition and processing of sets onto a magnetic tape in any random format, and thus makes possible cooperation with large computers of the types JSEP, IBM, SIEMENS, etc., and other functions routinely used with these acquisition systems.

The MARKAB system consists of two main components:

--the host operating system DOS KP (DOS RVR 2),
--the subsystem itself for preparation, acquisition and preprocessing of data.

TMOS (SM 3-20, SM 50/50, SM 4-20, SM 52/11)

The testing monitor operating system is intended exclusively for testing and diagnostic purposes. It is a part of the standard software supplied with computers.

12. Testers

All the testers in production and special measuring devices (common busbar simulator, ATD, servicing programmer panel, etc.) can be ordered directly from their manufacturer ZVT Banska Bystrica, Namestovo Plant. These products are not marketed by Office Machines.

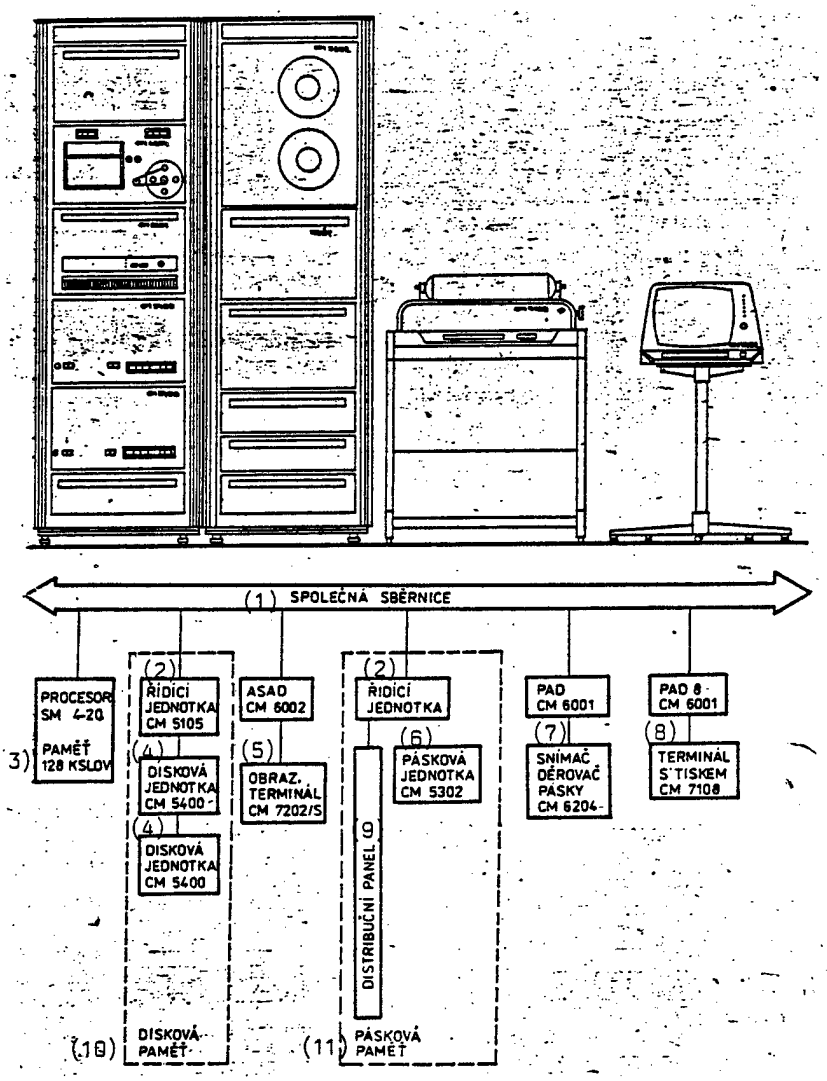


Figure 1. SM 4-20 microcomputer (variant 1/4)

Key:
1. Common busbar
2. Control unit
3. 128 K word memory
4. Disk unit
5. Display terminal
6. Tape unit
7. Tape reader/perforator
8. Terminal with printer
9. Distribution panel
10. Disk memory
11. Tape memory

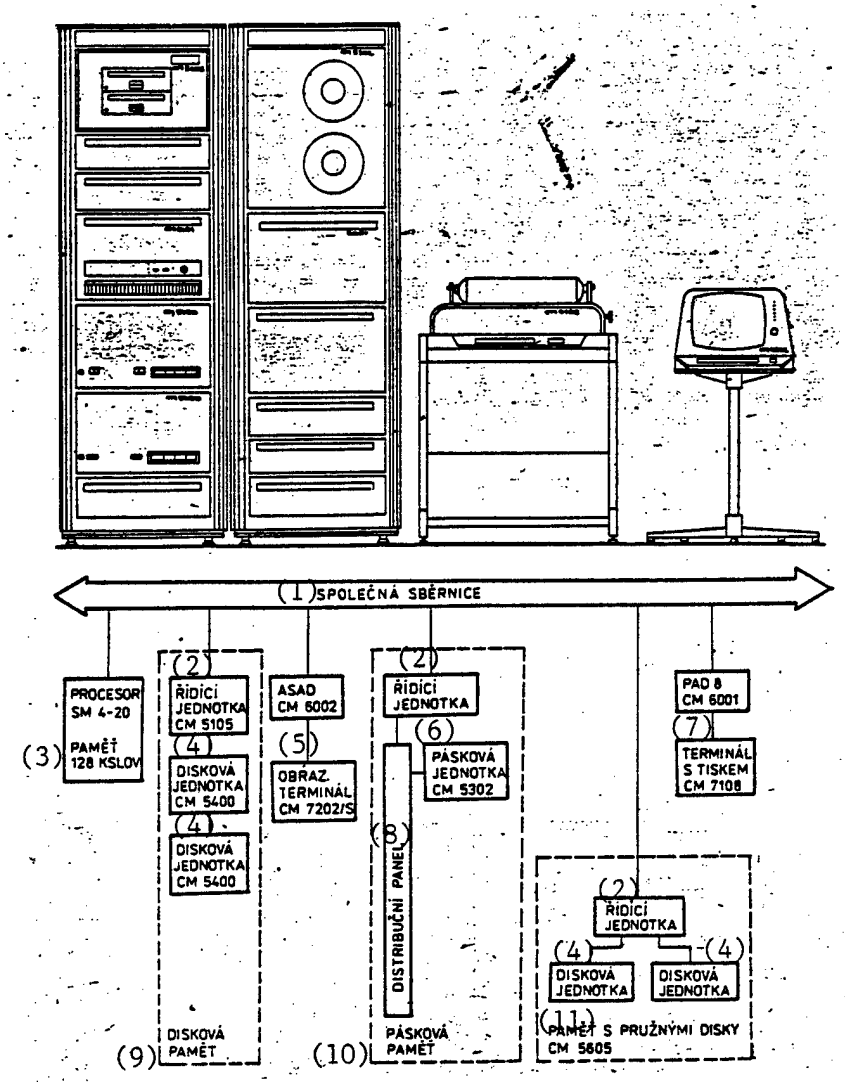


Figure 2. SM 4-20 microcomputer (variant 2/4)

Key:
1. Common busbar
2. Control unit
3. 128 K word memory
4. Disk unit
5. Display terminal
6. Tape unit
7. Terminal with printer
8. Distribution panel
9. Disk memory
10. Tape memory
11. Floppy disk memory

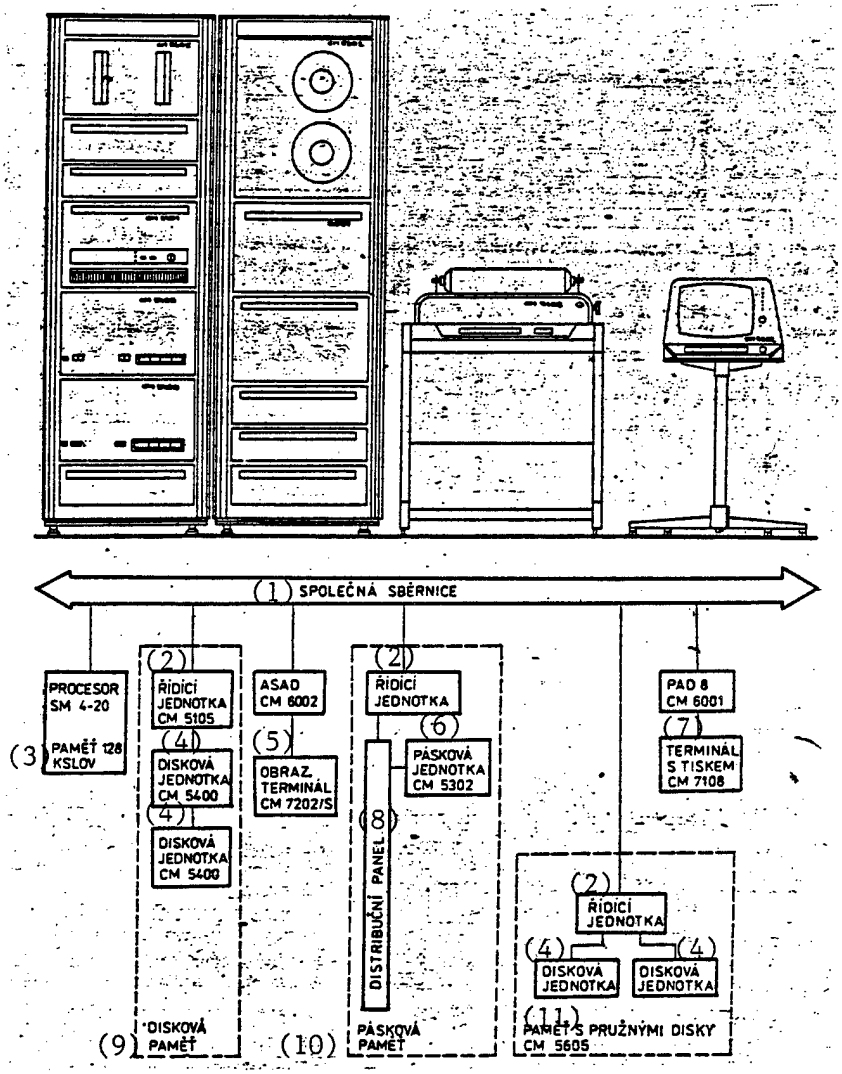


Figure 3. SM 52/11 minicomputer

Key:
1. Common busbar
2. Control unit
3. 128 K word memory
4. Disk unit
5. Display terminal
6. Tape unit
7. Terminal with printer
8. Distribution panel
9. Disk memory
10. Tape memory
11. Floppy disk memory

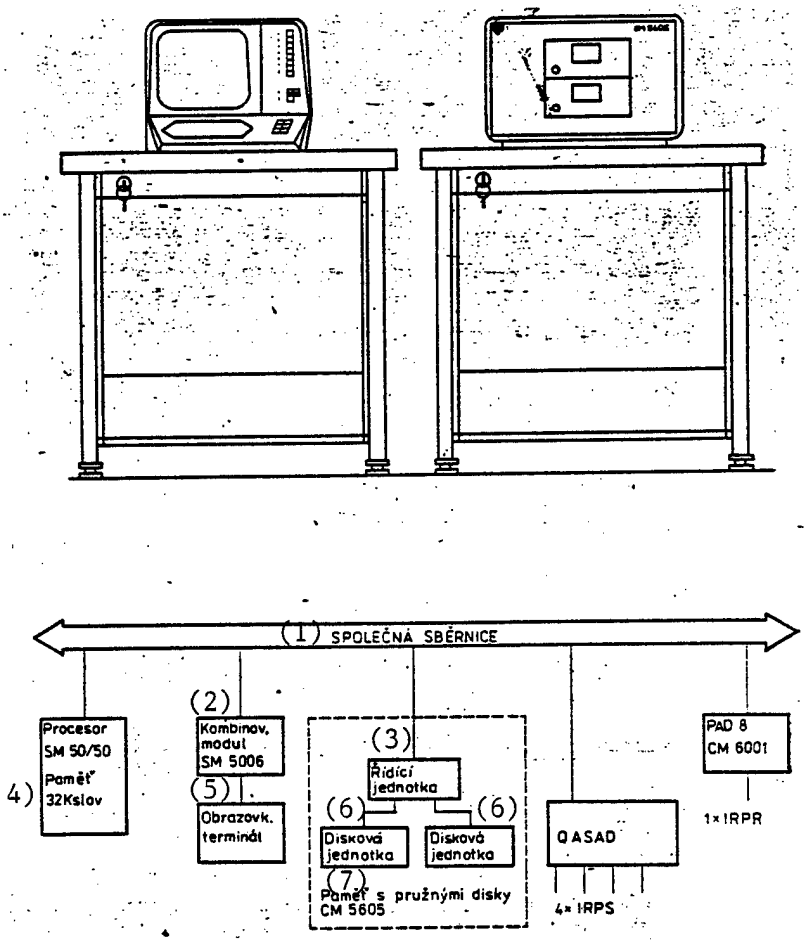


Figure 4. SM 50/50 terminal station

Key:
1. Common busbar
2. Combined module
3. Control unit
4. 32 K word memory
5. Display terminal
6. Disk unit
7. Floppy disk memory

SMEP Conference

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 63-73

[Article by Eng Ivan Peceny, Office Machines, Prague: "SMEP '83 Conference in Prague"]

> [Text] SMEP minicomputer and microcomputer technology is supplied to Czechoslovak users in hundreds of units annually. The measure of innovation of hardware and software, the great number of deliveries and fast proliferation of successful applications as well as users' acquisition of proficiency in the operation of SMEP systems are becoming reflected in the amount of interest in the by now traditional conferences and seminars held by the Prague municipal council of the Committee for Applied Cybernetics (KAK) of the CSVTS [Czechoslovak Scientific and Technical Society] in the House of Technology in Prague. It is one of the most widely attended nationwide presentations of the CSVTS Prague.
>
> The first seminar of this series held in 1978 enabled its participants to familiarize themselves with individual SMEP I systems and software. The SMEP '79 seminar was oriented toward software for the SM-3 and SM-4 computers (particularly the FOBOS operating system). In 1980 the presentations were oriented toward setting up and utilization of hierarchical SMEP and ASVT systems. The SMEP '81 seminar, like the first one, concentrated primarily on the experience gathered in the application of by then routinely available SMEP systems. The 1982 seminar with international participation had lecturers from the GDR and Hungary. An entirely extraordinary nature was lent to it by an exposition of SMEP hardware set up by personnel of the VUVT [Computer Technology Research Institute] in Zilina. The chief SMEP designer for the CSSR and deputy minister of the FMEP [Federal Ministry of Electrotechnical Industry], Eng Karel Horvath, CSc, reviewed in his keynote address the results attained in the SMEP I stage and offered detailed information about the plans for continued development and production of Czechoslovak minicomputer technology. A series of copresentations then provided the participants with a close-up of individual hardware and software of the SMEP II program.

In 1983 the SMEP '83 conference in Prague took place under the aegis of the chief SMEP designer for the CSSR and deputy minister of the FMEP, Eng Karol Horvath, CSc, on 25-27 October. It was attended by 825 participants, lecturers and guests. The CSVTS House of Technology in Prague--which organized the conference--prepared for the participants a monograph containing 39 presentations. In addition to plenary proceedings, the conference

participants worked in five sections thematically oriented toward the following problems: services provided by NOTO [National Organization for Technical Services], generation of applicational software, experiences with application of SMEP minicomputers and microcomputers, methods and forms for SMEP computer applications, methods and techniques of programming. Also part of the seminar was an extensive program exchange panel with accompanying panel discussion. A total of 54 presentations were offered in the plenum, in sections and at the program exchange panel.

The training department of Office Machines prepared on the premises of the conference a small exhibit of documentation sets for SMEP computers:

--publication series of user documentation issued in joint cooperation by Office Machines, Datasystem and VUVT for the SM 50/40 microcomputer system--this series includes today 35 titles;

--publication series of instructional documentation issued by the training department for participants in technical, programmer and operator courses which today contains 47 titles.

The SMEP '83 conference--similarly to 1981--was conceived as an all-round opportunity for mutual sharing of experience and information among suppliers and users of the SMEP system. For that reason, preparation of the conference by the KAK CSVTS and the House of Technology in Prague was participated in by CSVTS branches in Office Machines Prague and VUVT Zilina.

1. Conference Plenum

The keynote presentation at the conference plenum was the address by Eng Karol Horvath, CSc, chief SMEP designer for CSSR, who informed the participants of the current state and future prospects of the SMEP program in the CSSR. Within his address he concentrated primarily on the SM 52/11, SM 50/50 systems and other relevant SMEP minicomputer and microcomputer models, the status of efforts to provide an opportunity for utilization of a SMEP computer network, the developed family of SMEP personal computers, on problems attendant to POK and on the updating of information as well as the availability of input, output and memory systems for SMEP computers in the remaining years of the Seventh 5-Year Plan.

Follow-up reports were presented by the deputy technical manager of Office Machines, Eng Jaroslav Roztocil (substituting for the organization's manager), and the manager of the Namestovo plant of ZVT [Computer Technology Plants] Banska Bystrica, Eng Eduard Gluth, who supplemented and specified the information contained in the address by FMEP Deputy Minister Horvath.

Into the subsequent part of the plenary proceedings were incorporated contributions familiarizing the participants with the status of efforts involving applicational software for the SMEP series computers. Eng Jaroslav Dvorak (Office Machines Prague) offered information about the contents and structure of the type applicational software ASRP VARS/SMEP, [computerized system for management of enterprises, multilevel automated system of

management/SMEP] and in so doing introduced a whole series of presentations regarding the individual VARS/SMEP subsystems prepared for the APV [applicational software] section (see 3.). Jan Hladik (VUSE [Research Institute for High-Voltage Engineering] in Bechovice) presented a report on an unconventional concept of ASR [computerized system of management] for the research institute using the SM 4-20 and introduced thus more detailed information about the software and the organizational aspect of this concept presented within the program exchange panel.

2. NOTO Services Section

Addresses were presented within the section devoted to the services provided by the NOTO organization by personnel of Office Machines Prague offering information about selected type of services for SMEP users. Marketing information of a specifically commercial nature was not included in the section's program, because users making preparations for deliveries in 1983-84 were familiarized with it as part of the training seminar Computer Technology '83 held in Prague during September and October.

Drahomir Pertile presented information about transfers and forms of maintenance of basic SMEP software and the experience of the personnel of the parent plant in Prague in this area of services. Eng Jan Balousek provided comprehensive information about the services provided by NOTO in the area of basic software. Eng Jaroslav Broda familiarized the section's participants with the contents and forms of deliveries of basic software now under preparation for the 8-bit SM 50/40 microcomputers. Eng Kvetoslava Karlova characterized in her presentation the innovated system for training specialized personnel for SMEP system customers. Eng Vaclav Bures presented information about the functions and possibilities provided by the software for the SM 50/40 office computer as devised by Office Machines.

3. APV VARS SMEP Section

Generation of type applicational software (TAPV) for SMEP users is currently in progress as part of State Project for R&D Development P 04-119-214. The VARS SMEP system includes the subsystems Technical Preparation of Production (TPV), Operational Production Control (ORV), Material and Technical Supplies (MTZ), Personnel and Wages (PAM), Marketing (ODB), Economic Information (EKI), Long-Term Assets (ZAP), Economizing with Energy (ENE), Higher Contracting Forms (VDP), and Administration and Management of Nonproductive Organizations (SNO). The subsystems processed in the first stage were TPV, ORV, MTZ, PAM, ODB, EKI, ZAP, ENE, VDF and network analysis.

The coordination center for dealing with key task 02--TAPV VARS SMEP--is Office Machines Prague. The analytical design of TAPV VARS/SMEP corresponds thematically to the structure of the involved areas of TAPV VARS/DOS, with the exception of VDP, which is not dealt with in VARS/DOS for the time being. The TAPV VARS/SMEP programs are written for the most part in COBOL and are applicable to hardware SM 4-20 and SM 52/11 and other minicomputers which permit use of DOS RV.

National tests of the VARS/SMEP system which were to verify primarily the functioning of individual subsystems and their mutual linkages progressed in December 1983. The organization and progress of national tests is provided by the VARS System Administration in cooperation with participating enterprises. It also coordinates design verification in selected enterprises. National tests of the TAPV VARS SMEP system used data of the ZPA enterprise in Kosire.

After the completion of national tests the TAPV VARS SMEP will be turned over to the NOTO Library of Programs, which will provide for other follow-up activities related to deliveries and sales of the VARS SMEP system to users. TAPV VARS SMEP should be turned over to the NOTO Library of Programs at the latest by the end of the first quarter of 1984. The programs and documentation taken over into the NOTO Library of Programs will already be adapted to meet all comments from national tests. In view of the fact that the printing of documentation is a time-consuming proposition, as is the resolution of some legislative and pricing measures, TAPV VARS SMEP will probably not be turned over to users until the second quarter of 1984.

The VARS SMEP system will be for sale. In this respect it is envisioned to make use of all the experience gathered in long-term practical deliveries to TAPV MARS users and experience with the already ongoing sales of TAPV VARS/DOS. A significant role in making the VARS SMEP system accessible to Czechoslovak users will be played by residential courses which are being prepared for the individual subsystems by the training department.

Office Machines availed itself of the extraordinary opportunity offered by such an unusual concentration of the technical public as the SMEP '83 conference, and prepared (ahead of offering the VARS SMEP system after completion of national tests) in the form of 14 presentation an independent special section of the conference. In this way the conference participants received an opportunity to gain an overview of the possibilities offered by the TAPV in preparation directly from designers of the individual subsystems. Eng J. Kychta (Office Machines Brno) outlined the contents of the set's all-purpose program components being readied for VARS SMEP designers and users; J. Dostal (Office Machines Gottwaldov) outlined the generation and application of the DOS RV operating system for VARS/SMEP applications; Eng S. Istok (USIP [Institute of Industrial Systemic Engineering] Bratislava) informed the audience about the contents of the TPV and ORV subsystems; Eng J. Horacek (Office Machines Gottwaldov) about the MTZ subsystem; Eng M. Hric (USIP Svit) about the ZP subsystem; and Eng V. Blaha (Office Machines Kralove) about the EKI subsystem. The possibilities offered by the ODB subsystem were outlined by Eng J. Patek (USIP Trencin), the PAM subsystem was discussed by Eng N. Zid (VSE [Institute of Economics] Prague), and the ENE subsystem by Eng F. Bielik (Datasystem Bratislava). The provisions made for application of the developed TAPV in nonproductive organizations were discussed by Eng V. Roubicek from the SBD [Housing Construction Cooperative] Pokrok in Prague. Eng S. Tyle (Office Machines Prague) offered information about the system of network analysis devised for the SM 4-20, and K. Stehno about the procedure followed in turning the VARS SMEP system over to users.

4. SMEP Applications Section

The presentations within this section of the SMEP '83 conference included that of Eng J. Koberec (Elektropristroj Modrany) with information about a set of programs for data acquisition under the DOS RV for SM-3/SM-4 computers, Eng J. Havlena (VUMH [Research Institute of the Ministry of Local Economy] Prague) shared with the listerners his experience with SMEP application in the area of local economy, Eng E. Kloubkova summarized the experiences gained by her workplace (VUVT Zilina) with applications of systems for the preparation, preprocessing and transmission of data on SMEP I computers, and Eng Sotfko (Datasystem Bratislava) supplemented information about the GOLEM system, which will expand its applications starting with 1984. L. Nagy, MD (State Sanatorium Bratislava), provided information about application of the SM 4-20 for handling of selected NsP [subsystems, Eng M. Hron (VUZ [Railroad Research Institute] Prague) about the application of a SMEP computer for the generation and utilization of a data base, Eng J. Laga (VSE Prague) about the use of a data base within the DIAMS operating system. Eng A. Motycka Office Machines Ostrava) presented a report on "Planning of Control Systems with the Use of MODUS Software," and Dr Nagy, for the absent Eng Pis, a report on an "Interactive Classification System."

5. Experience Sharing Section

In the section "experience," Eng Kotulan (CKD Prague) offered information about the operation fo the extensive PDP-11 computer system, Eng M. Peceny (MTTU Prague) about the modification of the DARO 1156 printer for accelerated printing, Eng Z. Antos (Skoda Ostrov) about DOS RV application in mass data processing on the SM 4-10 computer, and Eng K. Grof (SKODA Ostrov) about the use of the SORT program in DOS RV during the processing of single-volume sets.

Eng J. Rusina (NHKG [New Klement Gottwald Metallurgical Plants] Ostrava) shared his experience with the utilization of the RSX-11M operating system, and the use of the SM 4-20 for student instruction at the Computer Science Chair of the FEL CVUT [School of Electrotechnical Engineering of the Czech Institute of Technology] was discussed by V. Vlachovsky.

6. Programming Section

Within this section Eng J. Jezik (Office Machines Vsetin) presented a report on the problems attendant to structured programming, and J. Pavelka, Dr Nat Sci (CKD Prague) offered information about the structured Assembler "PAGOL."

Eng P. Gubi (Office Machines Ostrava) presented a report on DATOS and DYNAMIT software offered as a tool for improving the efficiency of supportive management functions.

Eng J. Chudej (NHKG Ostrava) offered information about software for the generation of printout formats in real time, and Eng Z. Marik (Office Machines Prague) about the concept of dynamic expansion of DOS RV Executive. Eng M. Hron elaborated in his presentation the text editor devised in Orgaprojekt Prague and VUZ Prague (see 7.29).

Eng Z. Vaculin (Office Machines Vsetin) familiarized the listeners with the method of communication between operator and the DOS RV user system, and the possibilities for the generation of microprocessor software on SMEP minicomputers were discussed by Eng F. Kopriva (TESLA ELTOS Prague).

7. Software Exchange Panel

A very attractive part of the conference was the program exchange panel. The participants were offered the opportunity to post on conference premises that part of the seminar application in which they pointed out software that could be of potential interest to other users.

In an independent block of time set aside for a panel discussion, interested parties were offered the opportunity to elaborate on the presented offer in a brief oral communication. As the panel form of the programs exchange progressed throughout the 3 days of the conference, due to the great interest shown by the participants in the offered programs we publish brief information about some of them in this form as well:

7.1 ADBMS-SMEP Data Base Management System for a Single User
For DOS RV and SM 4-20.
Information: UVVTR [Institute for Application of Computer Technology in Management], Revolucni Avenue 24, 110 00 Prague 1, Eng Heroutova, Eng Laifr, tel. 23 10 73 5.

7.2 ML/1-SMEP Dialogue Macroprocessor for Transformation of Text Sets According to Preset or Interactively Determined Rules
For DOS RV and SM 4-20.
Information: UVVTR, Revolucni Avenue 24, 110 00 Prague 1, R. Cerovsky, tel. 23 10 75 5.

7.3 Accounting System for Acquisition and Control of Input Data and Printout of Output Formats for Bookkeeping Purposes
For DOS RV and SM 4-20.
Information: Hydroconsult Bratislava, Radlinskeho Street 37, Daubner, Tel. 400 12, extension 214.

7.4 Program for Design and Assessment of Water Main Networks
For FOBOS and SM 3-20.
Information: see 7.3.

7.5 Program for Sorting of Sets of Random Size Under Minicomputer Conditions, High Speed, Repetition Points
For FOBOS and SM-3/SM-4.
Information: Orgaprojekt Prague, Dlouha Avenue 39, Prague 1, Dr Jiri Suchomel, tel. 23 11 48 4.

7.6 Set of Programs from the Area of Calculations and Cost Budgeting (statement of payments, continuous calculations, consumption of raw materials in spinning mills)
For SHARP MZ 80 K (Basic).
Information: BENAR Nat'l Enterprise, Benesov on Ploucnice River, Eng F. Kudrnac, tel. 942 41.

7.7 DISTST Program (program substitution for tester of IZOT disk unit)
For SM 3-10, 3-20, 4-10, 4-20.
Information: Vitkovice Construction Enterprise, Uderky Street 41, Ostrava 3, Eng Libor Folvarcny, tel. 363, extension 383.

7.8 All-Purpose Subprograms for Perforated Tape Reading and Magnetic Tape Recording; Conversion of SMEP Printout Formats to JSEP
For FOBOS and SM 3-20.
Information: Postal Directorate Prague, Politickych veznu Avenue 6, 111 22 Prague 1, Eng Kolinsky, tel. 74 26 82.

7.9 Automated Programming of Selected Types of NC Machinery (drilling machines, lathes and horizontal boring and milling machines)
For FOBOS and SM 3-10.
Information: SKODA Ostrov, see 7.34.

7.10. System of MASOD Programs for Assessment of the Parameters of Small Data Sets (computation characteristics of position and variability, tests of goodness of fit, correlation coefficient)
For RT 11, V 04 on JPR 12 R.
Information: CSAV [Czechoslovak Academy of Sciences], Institute of Geology and Geotechnics, Prague 8, V Holesovickach Street 41, Eng Podracky, tel. 22 23 45 - 7.

7.11 MTSDAT System of Programs for Assessment of Sets with Missing Data (computation of covariance, correlation, mathematics; discretionary analysis, etc.)
For: RT 11, V 04 on JPR 12 R.
Information: see 7.10.

7.12 RIS Rationalization Information System for Research Institute Management (working time record, labor and overhead costs, travel orders, OON, incoming invoices, cooperation, billing, accounting instructions, employee records)
For FOBOS and SM-3.
Information: VUZ Prague, Luzickeho seminare Street 3, Prague 1, Eng Milos Holecek, tel. 21 61 53 15.

7.13 Program Base for Multiuser Communication Systems for Their Generation Under Single-Task OS FOBOS
For FOBOS on SM-3/SM-4.
Information: VUZ Prague, Luzickeho seminare Street 3, Prague 1, Eng Hron, tel. 21 61 48 24.

7.14 Program Providing for Printout of Sets According to Status of Switches (printout of a specific number of pages from page indicated, multiple printouts, etc.)
For DOS RV, type of printer irrelevant.
Information: Transportation Enterprise of the City of Ostrava, Podebradova Street 2, 701 71 Ostrava 1, H. Sobkova, tel. 44 22 41.

7.15 System for Automated Data Acquisition From 10 Terminals (keyboard-disk-output, retesting, editing, utility)
For FOBOS and SM 3-20.
Information: Tesla-Plant 114, Palackeho Avenue 644, 388 15 Blatna, Eng Vesely, tel. 24 21, extension 387.

7.18 HELP System in Czech (interactive operator's handbook)
For DOS RV on SM 4-20.
Information: Skoda-ZVE. 316 00 Plzen, Eng Stelzer-216/9980.

7.17 LSTHLP System for Location and Czech Description of Errors During Translation by the F 4 P Translator
For DOS RV on SM 4-20.
Information: see 7.16.

7.18 VTVFOR and MSMFOR Libraries of Relative Modules-subprograms from the area of scientific and technical calculations and mathematical and statistical methods
For FOBOS and DOS RV on SM 3-20 and SM 4-20.
Information: Datasystem, Jana Osohu Street 12, 821 02 Bratislava, Zendulka, Dr Nat Sci, tel. 22 61 40.

7.19 ROOTS Program for Computation of Real and Complex Roots of Nth Degree Polynomials
For FOBOS 2 on SM-3.
Information: Tesla Pardubice, Zamecka Street 26, 532 01 Pardubice, Eng Borsky, tel. 293, extension 66 48.

7.20 TPX Program for Conversational Preparation of Graphic Data On 1/2" Magnetic Tape (drafting on didigraf with the MTC 30 system)
For SM 4-20 in DOS RV.
Information: Skoda Plzen, ZES-VVZ [Power Engineering Machinery Plants, R&D Base]
Turbiny, Ceskych Bratri Square, 316 00 Plzen.

7.21 APV for an Interactive System of Automated Design on the Basis of the SM 4-20 (GRASYDEL integrated circuit design, DEFOR computation of structure, ISAN 1 printed circuit design)
For SM in DOS RV.
Information: Datasystem Bratislava, Stefanovicova Street 4, Eng Liebl.

7.22 PROHL Program Facilitating Search of Sets Generated on Magnetic Tape by JSEP or IBM 360 Computer
For DOS RV. FOBOS and/or RSX 11.
Information: Metallurgical Installations, Hrusovska Street 20, Ostrava 1, P.O. Box 728 00, Eng Gerlich, tel. 22 91, extension 748.

7.23 Generator of Standardized JSEP Programs for Generation of Programs in ASSEMBLER
For DOS and/or DOS-3(4)/JSEP.
Information: Gravel and Sand Quarries, Republika Square 3, 771 55 Olomouc, Eng Svarc-339 86.

7.24 Automated Dynamic Recording of Addresses for Selective Generation of Address Directories of Addressing Labels
For DOS RV and SM 4-20.
Information: Office Machines Ostromecska Street 13, 130 00 Prague 3, J. Folprechtova, tel. 27 93 56.

7.25 Record of Consumption of Documentation Including Prognosis of the Need for Supplementing
For VU Basic and PPPD-1 on SM-3/SM-4.
Information: Office Machines Opletalova Avenue 22, 111 90 Prague 1, Dr Dana, tel. 22 28 56.

7.26 Program for Optimization of Routes in Emptying of Mail Boxes
For SM 4-20 in DOS RV.
Information: North Moravian Directorate of Communications, Mlynska Street 12, Ostrava, Eng Zahroj, tel. 21 14 20.

7.27 Programs for Operational Control of Animal Production (control of milch cow reproduction and individual monitoring of young horned cattle)
For FOBOS 2 and SM 3-20.
Information: JZD [unified agricultural cooperative] Svornost, 544 74 Horni Brusnice, Eng Sedlak, tel. Dvus Kralove 928 47 - 9.

7.28 Program for Critical Path Analysis by the CPM Method
For DOS RV on SM 4-20.
Information: see 7.3.

7.29 Text Editor Fully Substituting Systemic EDIT, Expanding Its Functions and Accelerating Operations Connected With Editing of Sequential Sets by More Than 50 Percent
For FOBOS 1 and FOBOS 2 on SM-3/SM-4.
Subject of improvement suggestion 96/83.
Information: see 7.13.

7.30 All-Purpose Program System for Mass Data Processing on a Minicomputer
For FOBOS on SM-3/SM-4.
Information: Transportation Research Institute, Velky Diel, 011 80 Zilina, Eng Mikusiak, tel. 359 51 - 5.

7.31 System for Data Preparation (Data batch and individual data defined by means of input forms, data conversion to magnetic tape for JSEP)
For DIAMS 1 on SM-3/SM-4.
Information: see 7.30.

7.32 ODBYT Subsystem for Acquisition, Control and Maintenance of Marketing Data Including Final Printout of Documentation (80 percent tasks of the ODB MARS/VARS subsystem)
For FOBOS on Sm-3/SM-4/JPR 12 R.
Information: Sigma, Usti on Elbe, Jatecni Street, 400 25 Usti on Elbe, Eng Hlavsa, tel. 73 51, extension 436.

7.33 Expansion of OS FOBOS by Modules and Macroinstructions for Processing of Logic Sentences by Sequential and Direct Access, Arithmetic Calculations and Other Mass Data Processing Functions
For FOBOS 1 and FOBOS 2 on SM-3/SM-4 and JPR 12 R.
Information: see 7.32.

7.34 Parametrically Controlled Program for Conversion of Sets on Magnetic Media
For DOS RV on SM-4.
Information: Skoda, Ostrov plant, ASR unit, 363 29 Ostrov.

7.35 Modules for Implementation of Standardized Programming in FORTRAN in the Form of Independently Compilable Procedures
For DOS RV on SM-4.
Information: see 7.34.

7.36 Conversion Programs for Conversion of Data Between JSEP and SMEP Computers and Between the OS, DOS, DIAMS 1 and FOBOS 1 Operating Systems
For SM-3/SM-4 with DIAMS 1.
Information: see 7.30.

7.37 Terminal Network Monitor for ASR of Small Plants (immediate response to query from up to eight terminals, easy incorporation of tasks into the system, TPV, MTZ and ORV agendas)
For FOBOS on SM 3-10.
Information: Elektropristroj Rokytnice on the Jizera River, Eng Hejral, tel. 923 41, extension 7.

7.38 Set of Arithmetic Programs and Programs for Matrix Operations With Format of Number of Equivalent I 8231 Arithmetic Processor
For microcomputers with I 8080.
Information: Chair of Automated Control, School of Chemical Engineering, Slovak Institute of Technology, Janska Street 1, 812 37 Bratislava, tel. 509 96.

7.39 REDAP Relational Data Base Processor on the SM 4-20 Computer Containing Instructions for Operation With Relational Structures (80 percent of the contents of conventional programs from the ASR area can be solved by combining several instructions into a chain)
For DOS RV on SM 4-20.
Information: VUSE Bechovice, 250 97 Prague 9, Jan Santl, tel. 73 53 51-9, extension 24 73.

7.40 SIRT Programs (sorting in memory blocks of fixed length at a speed of 16,000 numbers per 23 seconds) and SORP Programs (sorting in disk set block of fixed length--25,000 blocks of 26 addresses in 5 minutes) Without Auxiliary Memories
For DOS RV on SM 4-20.
Information: see 7.39.

7.41 Set of CODE Macroinstructions Facilitating Automatic Generation of Control Structures in a Program
For DOS RV on SM-3/SM-4.
Information: Office Machines ORS, Smetanova Street 1453, Vsetin, Eng Jezik, tel. 4517.

7.42 HLASKA Complex Facilitating Output to Terminal and Filing of Data on a Disk
For DOS RV on SM-3/SM-4.
Information: Office Machines, ORS, Smetanova Street 1453, Vsetin, Eng Vaculin, Tel. 40 70.

7.43 CHYPRO System for Processing and Printout of Diagnostic Reports About Errors in Carrying Out Systemic Directives, Input/Output Operations, operations FCS, RMS and User-Defined Errors
For DOS RV on SM-3/SM-4.
Information: Office Machines, ORS, Smetanova Street 1453, Vsetin, Eng Rousova, tel. 45 17.

7.44 Problem-Oriented Complex for Agricultural Enterprise Management
For DOS RV on SM-3/SM-4.
Information: Datasystem, Stefanicova Street 4, Bratislava, Eng Adamec, tel. Prague 35 50 74.

7.45 LISP Programming System
For DOS RV on SM-3/SM-4.
Information: Datasystem, Jana Osohu Street 12, 821 02 Bratislava, Eng Stofko, tel. 22 61 40.

7.46 Software for Digigraf Control by SMEP Computer--facilitates control of drafting desk
--DAPOS type off-line through perforated tape,
--D3G.1 off-line through perforated tape,
--EC 7907 type off-line through perforated or magnetic tape,
--EC 7907 type on-line.
For SM-3 with OS FOBOS and SM-4 with OS DOS RV. Subprograms can be used in FORTRAN IV or FORTRAN IV PLUS.
Information: Metallurgical Project Prague, Enterprise Management, Opletalova Avenue 37, 111 84 Prague 1, Enf Vondras, tel. 22 08 51, extension 397.

7.47 SYNTAX--syntactic analyzer of BASIC for SM 3-20, performs syntactic analysis to include indication of program errors in BASIC (for interpretive translators)
For FOBOS and/or VU BASIC and PPPD-1 on SM 3-20.
Information: Technoplast, 768 11 Chropyne, M. Moravcova, tel. 932 01, extension 682, Improvement suggestion administrator: Fatra, Napajedla, P.O. Box 763 61.

7.48 APV for Operation With Data Base on the Basis of a Description of Its Structure Through a System of Parameters
For DIAMS 2 on SM 4-20.
Information: Chemoprojekt, Budovatelska Avenue 287, Prague 9, Eng Jinda, tel. 83 82 51, extension 63.

7.49 APV for Generation of Input/Output Forms or Formats, including a library of parameters, their controls and conversions
For DIAMS 2 on SM 4-20 with SM 7202 terminals.
Information: see 7.48.

7.50 Diagnostic Programs of a New Concept Facilitating Debugging and/or Repairs of Hardware (RKSIM--diagnosis of compatibility of CM 5400 disk units, ASAD--daignosis of zonal data transmission route)
For SM-3/SM-4 in ASSEMBLER.
Information: MTTU Prague, Olsanska Avenue 6, 130 80 Prague 3, B. Sikora, tel. 71 44 07 3.

7.51 MINIG Graphic System Not Dependent on Peripheral Equipment, Suitable for SMEP Computers
For SM 4-20 with DOS RV.
Information: VUES [Research Institute for Electric Machinery] Brno, Mostecka Street 26, 657 65 Brno, Datasystem Bratislava, Eng Liedl, tel. 226 40.

7.52 GPSS--FORTRAN Simulation Language--all-purpose means for simulation of discrete systems (production, installation, automated production sectors, etc.)
For SM 4-20 with DOS RV.
Information: Institute for Development of Machined Consumer Goods, Sladkovicova Street 19, 921 01 Piestany, Eng Jiri Zeman.

7.53 POK for Quality Control in the Field of Testing, Testing of Operational Reliability and Statistical Quality Control
For SM 4-20 and DOS RV.
Information: see 7.52.

The program exchange panel also offered a ready-made connection for the FS 1501 reader to the SM 4-20 computer by means of a PAD (CM 0701) standard interface plate and conversion plates for control and modification of voltage levels. The conversion plates use components the price of which does not exceed Kcs 600 in Tesla ELTOS outlets. Information: North Moravian Directorate of Communications-VS [Computer Center], Ostrava, Eng Karel Tuma, tel. 21 24 04.

8. Bratislava Programming System

The Bratislava programming system (BPS) was presented during the course of the conference as an integrated programming system under DOS RV V2/SMEP.

The BPS was developed in the Computer Research Center in Bratislava and is distributed by the designing organization, by the Ostrava branch of Office Machines or by Datasystem Bratislava which, moreover, distributes it to users abroad. The system is currently implemented by more than 30 SMEP users.

The BPS system as an integrated programming system includes the following mutually cooperating components:

--BPS control language,
--BPS control program,
--BPS library,
--language resources,
--communication resources,
--documentation resources,
--editing resources,
--resources for handling BPS libraries.

The language resources are represented by the compiler of the BPS/L programming language. Programming can also be done in ASSEMBLER or FORTRAN with the use of the BPS system. The BPS/L programming language was devised on the basis of Wirth's MODULA language, whereby BPS/L has an expanded functional range from the area of program coding to the program structure design phase. BPS/L supports two programming methods--it promotes the method of modular programming throughout the program's structure with individual data and control structures corresponding to the principle of structured programming.

Prior to implementation on SMEP the BPS system was successfully tested in an extensive number of applications using JSEP (OS), Hewlett-Packard 1000, ADT 4500 (DOS, RTE), PDP-11 (RSX 11 M) computers.

The training department of Office Machines Prague is organizing for BPS users and other interested parties the course 890-4036 Bratislava Programming System on 2-6 April 1984 in Havirov.

9. Conclusion

Given that the main objective and purpose of the conference was improved familiarization of the technical public with the SMEP program, the promotion of mutual sharing of experiences and on so doing--in keeping with the basic mission of the CSVTS--contributing to improved effectiveness in the use of available SMEP computers and cutting down on the time for launching SMEP hardware and, particularly, new software into operation, there can be no doubt that it succeeded.

The conference participants all agreed in stating that it would have been better to stage the extensive program sequentially, because parallel progression of sections did not make possible for all attendants to fully participate in the conference proceedings. However, extension of so wide-ranging a presentation is not deemed possible from the viewpoint of superior CSVTS agencies--as it is, the conference tied up expensive manpower of many specialists from computer centers. The recommendations formulated at the conclusion of the conference for CSVTS authorities purpose:

--to thematically specialize from year to year these meetings of specialists working with SMEP computers so as to preclude attendance from exceeding 250-300 persons;

--to provide for an extraordinarily expanded coverage of the monograph for presentations that attract as many listeners as SMEP conferences;

--to stage in 1985 a representative SMEP conference with the participation of the Slovak Council of KAK spanning 5 days.

The conference participants pointed out in the direction of state and economic agencies and organizations the inadequately equipped capacities of NOTO organizations providing marketing and engineering services in the SMEP program. These organizations are not capable of meeting in a satisfactory manner supplier services and technical servicing and, to a lesser extent, other relevant services for SMEP users. There is also a need for coming to grips with the exceedingly long deadlines which separate the completion of implementational output in the area of research and start-up of serial production of SMEP systems.

Lively discussions which accompanied the individual thematic areas in the conference plan and in individual sections documented the active interest of users in the conference agenda and in improving the conditions for devising user-friendly SMEP configurations with the requisite operational reliability effective from the viewpoint of the national economy. The next SMEP '84 conference in Prague will be held on 17-18 October 1984. May it too contribute to attainment of this common goal.

KEDR Microcomputer

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 74

[Review by Ha of article in PRIBORY I SISTEMY UPRAVLENIYA No 10, 1983]

[Text] The KEDR microcomputer is a new Soviet single-purpose control computer for technological industrial processors. A system for microprogramming automation was devised for its use, considerably accelerating the generation of the requisite problem-oriented applicational programs. The key part of the system is a generator of microprograms oriented toward logic control algorithms not characterized by complex mathematical descriptions in the control process, e.g., in petrochemical operations.

New Soviet Interface Unit

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 74

[Review by Ha of article in PRIBORY I SISTEMY UPRAVLENIYA No 7, 1983]

[Text] The USSR commenced production of a new interface unit for SMEP computers with a built-in A 611-21 analog digital converter. It operates with 0.1 percent precision at a conversion speed of 15 μs and its noise suppression coefficient is 60 dB. The employed reed relays are characterized by long-term functional reliability. The interface unit offers the possibility of connecting a maximum of 60 unipole and 30 dipole channels with a technological or some other object.

Courses for SMEP Users

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 75-76

[Article by Training Department, Office Machines Prague: "Office Machines To Hold Additional Courses for Users of SMEP Control Systems in Second Quarter of 1984"]

[Text] The training department of the Office Machines fiduciary concern organization in Prague is preparing, on the basis of concluded economic contracts regarding computer deliveries, analyzed lists of user organization demands, and with a view to the status of deliveries of the SM 3-20, SM 4-10, SM 4-20, SM 50/40 and SM 52/11 systems, the following courses for managerial personnel, programmers and operators of SMEP and ASVT computers for the second quarter of 1984:

Number		From-To	Location
890 -4998	Bratislava Programming System (BPS)	2/4-6/4	Havirov
8670-4036	DOS-RVR/SMEP Operating System	2/4-13/4	Havirov
8860-4037	PASCAL/SMEP Programming System	2/4-13/4	Plzen
8600-4038	SMEP Computers and Their Software	9/4-13/4	Havirov
8050-4039	Technology of Structured Programming (formerly 810)	9/4-20/4	Prague
8820-4040	COBOL/SMEP Programming Language (advanced course)	16/4-20/4	Plzen
8885-4041	BASIC Plus 2 in DOS-RV/SMEP Programming System	16/4-20/4	Havirov
8610-4042	SM 3/SM 4 Architecture and Instruction Network	16/4-28/4	Havirov
8540-4043	Operation of SM 4-20 Computers	16/4-28/4	Havirov
8990-4044	PPPD-1 System	24/4-28/4	Prague
8890-4045	Multiuser BASIC/SMEP	24/4-28/4	Havirov
8600-4046	SMEP I Computers and Their Software (for attendants from Prague)	2/5-4/5 and 7/5-8/5	Prague
8887-4047	BASIC Plus in DOD-RVR/SMEP Programming System	2/5-4/5 and 7/5-8/5	Havirov
8740-4048	FOBOS Operating System for Programmers	14/5-25/5	Prague
8600-4049	SMEP I Computers and Their Software	14/5-18/5	Havirov
8930-4050	MIKROS/SMEP Operating System	14/5-25/5	Havirov
8850-4051	DOS-RV2 Operating System	14/5-25/5	Havirov
8820-4052	COBOL/SMEP Programming Language	21/5-8/6	Plzen
8610-4053	SM 3/SM 4 Architecture and Instruction Network	21/5-1/6	Havirov
8860-4054	DIMAS/SMEP Operating System	28/5-8/6	Prague
8970-4055	MARKAB System for Preparation, Preprocessing and Transmission of Data	28/5-8/6	Havirov
8651-4056	RSZ System and SORT Program in DOS-RV/SMEP	4/6-8/6	Havirov
8810-4057	FORTRAN/SMEP Programming Language	4/6-15/6	Havirov
8060-4058	Program Base for Multiuser Communication Systems (formerly 815)	11/6-15/6	Prague
8600-4059	SMEP I Computers and Their Software	11/6-15/6	Prague
8652-4060	DTS System in DOS-RV/SMEP	11/5-15/6	Havirov
8830-4061	BASIC/SMEP Programming Language	11/6-15/6	Havirov
8650-4062	DOS-RV2 Operating System	11/6-29/6	Plzen
8610-4063	SM 3/SM 4 Architecture and Instruction Network	18/6-29/6	Prague
8540-4064	Operation of SM 4-20 Computers	18/6-29/6	Havirov
8640-4065	FOBOS/SMEP Operating System	18/6-29/6	Havirov
8750-4066	Systemic Programming in the DOS-RV/SMEP Operating System	18/6-29/6	Havirov

The contents of individual courses, entrance requirements placed on attendants and recommended course sequences are contained in the pamphlet "Courses and Training 84" published by Office Machines Prague.

The DOS/ASVT system of courses is gradually being limited in favor of SMEP operating systems. Orders for DOS/ASVT documentation still used in courses are accepted as long as supply lasts.

The series of courses 8887 (BASIC-PLUS), 8670 (DOS-RVR Operating System), and 8970 (MARKAB System for Preparation, Preprocessing and Transmission of Data) is being prepared and offered for persons interested in the DOS-RVR (DOS-KP) and POK PPPD-2 operating systems.

The 8820 courses (COBOL/SMEP) are offered in 1984 as 3-week (for advanced cobolists as one-week) courses.

The schedule of courses includes course 8900-4036, Bratislava Programming System. The course is intended for users of the BPS system developed in the VVS Bratislava. The BPS was implemented over the past several years on several computers. Its implementation for SMEP is already used at 15 work centers. At the SMEP 83 conference it was presented as a tool for improving the efficiency and quality of generation of large program units. The system uses the nucleus, the sets control system and some service programs of DOS-RV/SMEP offered for users as an integrated unit with uniform operation and its own BPS/L programming language (based on the MODULA language) in which practically the entire BPS is programmed. The BPS system is distributed by VVS and Office Machines Ostrava or by DS (Datasystem) Bratislava.

Courses of the type 8110, 8150, 8190, 8310, 8885, 8900 and 8960 are held in 1984 for the first time as trial runs.

In the assignment of student groups for 8-bit SMEP computer courses and the selection of students for courses in which interest exceeds the capacity of the training facility, preference is given to organizations with a valid economic contract (HS) for computer delivery, inasfar as they had not undergone training.

The mailing of a requested page from the pamphlet "Courses and Training" is not meant as a listing of your needs, but merely to enable you to plan courses for the current calendar year. Enrollment in all of the offered courses should be requested at the following address:

Office Machines, fiduciary concern organization,
Control Systems Department,
Ostromecska Street 13,
130 00 Prague 3
tel. 27 93 56

Soviet SM-2M Minicomputer

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 76

[Review by Ha of article in AVTOMATIZATSIYA I KONTROLNO-IZMERITELNYE PRIBORY No 2, 1983]

[Text] The SM-2M minicomputer automates production of lubricating oils in the petrochemical combine of Volgograd. An algorithm for control of ASRTP [automated system for control of technological processes] by the SM-2M minicomputer was worked out on the basis of a mathematical description in the SKB NPO Neftekhnimavtomatika design and planning institute. The basic sensors are analyzers incorporated at several points along the flow of the processed product which perform fast analyses, the results of which are immediately transferred to the ASRTP set by means of analog digital converters with several seconds' delay.

Soviet Speech Synthesizer

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 80

[Text] The Soviet system for the generation of artificial language dictionaries forms the basis for speech communication with a computer by means of a speech synthesizer. The synthesizer is in essence a single-purpose electronic peripheral unit of the computer which models the function of human vocal cords and generates spoken language on the basis of electric input signals in digital form. The design is based in the first stage on the generation of dictionaries of artificial language which is done in the Soviet Union by means of the Elektronika 8001 D or Elektronika 60 T microcomputer. Selected words are stored by means of analog and digital form modules by program into memory on magnetic floppy disks.

CSSR Computer Development 1983-1990

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 81-92

[Article by Eng Miroslav Kepka, Automation and Computer Technology Plants concern, Prague, general management: "Concept for Development of Computer Technology for the Seventh and Eighth 5-Year Plans]

> [Text] The objective of this article is to familiarize the general technical public, our readers and specialists with the new concept for development of computer technology in 1983-1990 devised by the FMEP [Federal Ministry of Electrotechnical Industry] sector and submitted to the government after amendment proceedings. It was approved by the government on 1 August of the current year under No 157.
>
> The concept is based on the current state of application of this technology, on R&D in this field and its comparison with the worldwide standard, pointing out paths for meeting

the needs of the national economy, familiarizing specialists with new prospective computer technology resources, with services offered by commercial and servicing organizations in the areas of hardware and software. In conclusion, it lists the key proposed measures designed to promote the development of computer technology as part of electronization of the entire national economy.

Introduction

Computer technology has been meeting the needs of the national economy ever since the 1960's and at the present time it forms in our country the decisive tool for the management of enterprises and control of technological processes, in scientific and technical calculations and in many other fields. Advancement of this technology can affect the entire continued development of our economy to a substantial extent.

Computer technology is an integral part of the ongoing electronization of the national economy, which is a goal-oriented program for modernizing our industry and is monitored by the highest authorities.

The approved concept for the development of the computer technology sector under FMEP jurisdiction is based, on the one hand, on a detailed analysis of the current state of computer technology in the CSSR which can be characterized by a certain measure of lagging not only behind industrially advanced nonsocialist countries, but even behind most socialist countries. On the other hand, however, it respects the restricted potential for basic promotion of development which is limited at the present time by a shortage of investment and foreign exchange resources for renovation and modernization of the computers in use. An analysis undertaken by organs of the Economic Council of the MVK-VT [Intergovernmental Commission-Computer Technology] of CEMA in September of 1982 proved the direct linkage that exists between the share of per capita national income and the degree of availability of computer technology in advanced nonsocialist countries. Nevertheless, an absolute assessment of this relation within the possibilities of the currently used methods is very difficult, because the structure of socialist economy differs from that of nonsocialist countries. This is also borne out by the fact that the number of enterprises and organizations in recomputation to the number of inhabitants in our country is substantially lower. However, from the preceding it logically follows that demands on the total number of computer installations in our country must be lower and mutual comparisons cannot be made arbitrarily without taking this important fact into account.

Computer technology as a field is characterized by high contents of skilled labor, high price per kilogram, relatively low consumption of materials and energy, low demand on transportation, and its production does not pollute the environment. However, it places high demands on the qualifications of specialized cadres, on the technological level and reliability of electronic components and other elements. For these reasons, its development is

becoming a criterion for the development of our entire industrially advanced society. It directly affects improvements in the effectiveness of the national economy and the planned changes in the structure of production programs. That is why computer technology must be viewed with full earnestness and seriousness.

Research and development of computer technology has a tradition of long standing in our country and has met with success in the exportation of some top peripheral systems (perforated tape readers and punch card readers, punch card processors) and in special applications, such as analog technology and computer graphics. In the initial years after the conclusion of the agreement with socialist countries on joint research and development of computer technology within the established MVK-VT we were among the most active members and we also occupied a leading position in computer equipment among other socialist countries. However, it cannot be asserted that we managed to defend our leading position in subsequent years.

The objective of the new concept for development of computer technology is to stop the continued detrimental development in this field. This led in the first place to a reassessment of R&D as well as the production of new types of viable computers and the requisite peripheral systems for computer technology.

The development and production of JSEP will be oriented toward modular assembly of the system which will make it possible to expand its capacity from the level of small computers for data processing up to the level of large systems for medium and top levels of management. In keeping with this objective, the development and production of peripheral systems will be oriented toward an assortment representing most of the needs for complementation of such systems.

In the area of minicomputers and microcomputers the program remains oriented toward research, development and production of systems oriented toward control of technological and production processes, control of robots and numerically controlled machinery, automation of office operations, automated design systems, computer networks and specialized problem-oriented complexes.

A simultaneously pursued objective is increasing computer technology exports to socialist countries with the goal of achieving an active, or at least balanced, foreign trade balance in this area. The approved concept also deals with problems in the area of introduction of computers and in the area of servicing, and development of nationwide systems.

The key objective of the concept is also narrowing down the extensive assortment of computers in use, mobilizing capacities for the generation of user programs, improving the overall coordination of the generation of an array of programs nationwide, and finally providing adequate back-up for servicing.

Analysis of Current State and Comparison With Worldwide State

The following table (Table 1) offers an outline of computer technology application in the CSSR as of 31 December 1981 according to individual categories of computers and according to their origin. It shows that the number of registered and unregistered computers was 2,966 units, of which 978 units were JSEP and SMEP computers, i.e., 33 percent, of which again 542 units were of domestic CSSR production, i.e., 18.3 percent.

The listed average age of computers in use was 4.5 to 5 years. In view of the average service life expectancy of computers before becoming obsolete--which in industrially advanced countries is 6 years--it is consequently considerably adverse, because it is indicative of an imminent need for their replacement. Around 250 computers worth approximately Kcs 2.4 billion (in current prices) are currently employed in the CSSR annually.

Number of Personnel Employed in Operation of Registered Computers

Total number of persons	of which			
	Technicians	Programmers	Operators	PPPD operators
61,395	7,218	11,630	7,411	12,650

Use of Registered Computers According to Types of Tasks [in percent]

Type of task	ASR (AIS)*	VTV*	ASR TP	Tuning/Testing	Other operations
Total	55.4	4.8	0.7	19.9	19.2
of which					
--small	55.5	4.7	0.7	17.7	21.4
--medium	56.5	3.6	0.6	27.4	11.9
--large	49.0	10.0	1.6	31.0	8.4

*Key to abbreviations: ASR (AIS) = computerized system of management (computerized information system)
VTV = scientific and technical calculations

Table 1. Analysis of current state of availability and use of computer technology in CSSR

Item	Number of units	Of which produced by CSSR	CEMA	Nonsocialist countries (NSZ)	Total acquisition value (mill. Kcs)	Average age (years)
Registered computers						
Total	1,714	21	501	392	19,452	5
of which: small	1,411					
medium	219					
large	84					
Unregistered computers		SMEP CSSR	SMEP CEMA	Nat'l program of soc. countries & NSZ imports		
Total	1,252	114	83	1,055	1,892	4.5
of which: all-purpose	808					
for ASR TP	356					
multikeyboard	88					
Other computers						
Total	645				Amortized	obsolete & worn-out
of which: punch-card	193					
analog	440					
hybrid	12					
Total computers	3,611				20,354	

The analysis indicates that most computers find application in the ASR (AIS) area, i.e., 55.4 percent, and that use of computer technology for direct control of technological processes has been relatively low for the time being, i.e., 12.4 percent.

Effects of the use of computers on the development of the national economy must be assessed not only by their number, but particularly by the structure of the tasks performed. It turns out that their utilization is oriented for the most part toward the assessment of past activities and not toward direct influencing of an optimal progress of the production process.

It is also turning out that one of the causes of the slow rate of computer application in the area of ASR is--in addition to investment limits and restricted material resources--the still unresorted to demonstrability of the economic contribution and effectiveness of their utilization, a fact to which even our economic research is not devoting adequate attention. The low level of availability of computer technology in the national economy is made even more detrimental by its inadequate equipment with the requisite peripheral system for complementation and completion of the systems already in use. The consequence of this state is the inability to operate some systems fully and efficiently, particularly due to shortages of disk and tape memories and data acquisition systems.

The situation in software also does not meet user demands, particularly in the area of generation of user programs. First of all, there is no centralized record of programmer capacities, nor of the thematical contents of the nationwide available user programs, making their distribution and effective utilization more difficult.

The basic solution to this unfavorable situation must be the development of type programs. So far, the only such system is MARS (small automated control system) used primarily in general engineering. Of the total number of tasks, the MARS type programs cover 14 percent in the FMHTS [Federal Ministry of Metallurgy and Heavy Engineering], 25 percent in FMVS [Federal Ministry of General Engineering], 34 percent in FMEP and substantially less in other sectors.

The development of type programs is lagging in comparison to foreign countries. The reason can be sought, first of all, in the lack of uniform methodology and planning approach to the introduction of computer technology and, second of all, in lacking uniformity of the data base and algorithms for data processing. This shortcoming is reflected most conspicuously in ASRP. That is why a key R&D center with intersectoral jurisdiction was established at NOTO organizations for the sphere of type applicational software for ASR to introduce a uniform system and methodology into its generation.

In comparison with foreign countries the analysis showed that:

--the volume of production of small computers in the United States (including minicomputers) amounted in 1976 to 30 percent and in 1982 to as many as 55 percent of the volume of production of medium and large computers; the volumes for both groups will not become balanced until 1990;

--the relatively slow increases in the volume of production of micro- and minicomputers in the United States slated for installation (OEM) are due to sharply dropping prices of microprocessor technology;

--there is no substantial difference between the performance characteristics of JSEP and SMEP computers in comparison with top Western computers; for example, those of the EC 1026 computer are even higher than those of the IBM 270/125, but consideration must be given to the fact that they reach the users 6 to 8 years later than in nonsocialist countries;

--the level of basic software--which substantially affects the system's functional properties--is comparable to the Western level;

--according to indicators of numbers and value, the availability of computers in Western countries is much higher than in our country. We lag behind those countries by an average of 8 years, but in view of the difference of the respective economies this criterion is neither accurate nor of decisive importance.

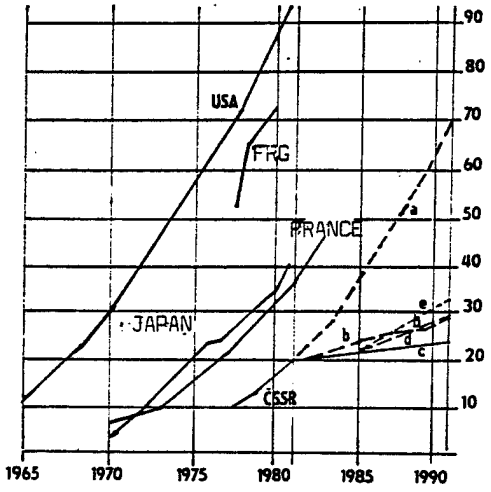
The development of the computer technology sector attains in industrially advanced countries higher rates than the development of other industrial sectors, proving in essence that investments made in the computer technology sector offer advantages. No adequate substantiation for this motivation has been offered in our country and that is why it failed to materialize.

No comparison of the development of computer technology in socialist countries is available at the present time.

Meeting the Needs of the National Economy

Criteria for determining the need for computer technology in the Seventh and Eighth 5-Year Plans can be selected from various aspects. If we want to use as a basis the data on the application of computer technology in industrially advanced countries in per capita volume data, as shown in Table 2, then the developmental trends in the CSSR are of an identical nature; however, we are lagging by approximately 5 years in comparison with France and Japan. At the same time, the volume relations for the United States and FRG are more than double in comparison with France and Japan.

Table 2. Trend in the development of computer technology application in industrially advanced countries in relative CSSR per capita recomputation [installed computers of acquisition value in billions of Kcs]



Key: a - keeping up with the trend in industrially advanced countries
b - by providing for simple replacement
c - according to the Seventh 5-Year Plan
d - increase in annual quotas by an index of 105
e - increase in annual quotas by an index of 110

The development of the prospective structure for application of computer technology is given by the trends in development of applications shown in Table 3.

Table 3. Areas of CSSR application of JSEP and SMEP computer technology

System / Area of application	JSEP				SMEP						
	EC 1026	EC 1027	EC 1027-4	EC 1027-8	SM 3-20	SM 4-20	SM 52/11	SM 52/12	SM 50/40	SM 50/50	SM 53/10
ASŘ V		(X)	X	X							
ASŘ SČ	X	X	X	X			(X)	X			
ASŘ P	X	X	X	X		(X)	X	X			
ASŘ indiv. agendas	X				(X)	X	X	X		X	
ASŘ TP					X	X	X	X	X	X	X
VS general use	X	X	X	X		X	X	X		X	
VS public services	X	X			X	X	X	X			
VTV-extensive (SAPR-ISAP)	(X)	X	X	X		X	X	X			
VTV operative	X	X				X	X	X		X	
Control of laborat. proc. & auto measur.						X	X	X	X	X	
PPPD					X	X	(X)			X	
Processing of texts	X	X	X			X	X	X	X	X	
POK SMEP					X	X	X	X	X	X	X
OEM VT					X	X	X		X	X	X
Computer networks	X	X	X	X		X	X	X		X	

It is envisioned that the extant key areas for ASRP application will be developing toward higher types of ASR which will be interconnected with not only the technological process itself, but also with the supraenterprise integration and with central control authorities. This main intent also spells out the demands on the technical characteristics and functional properties of the new technology. These will be provided for in practically their entire extent by the new JSEP systems EC 1027-4 and EC 1027-8, the modular design of which will make it possible to devise systems corresponding to medium and large computers with data base systems and the potential for establishment of computer networks, terminal systems and problem-oriented complexes.

At the same time there will occur a substantial increase in the rate of development in applications of minicomputers and microcomputers in the areas of ASRTP, particularly in continuous processes in general engineering, in the chemical industry, in metallurgical plant and in power engineering, in the production of construction materials, etc. Applications are found herein

primarily by SMEP computers. At the same time consideration must be given to the fact that the prospective trends point toward individual applications and a closer connection between computers and the controlled process. The intent of the adopted concept for the development of computer technology is to create conditions conducive to making computer technology available, prevention of stagnation and assurance of continued gradual development in the use of this technology in all branches of the national economy.

Prospective Computer Technology Systems in the Seventh and Eighth 5-Year Plans

The basic structure of these systems is based on the JSEP, SMEP program and on systems that already were in production, under development or prepared for incorporation into the plan of technological development.

a) Medium and Large Systems

The system currently produced and supplied is the EC 1026 with main (working) memory storage capacity of 512 Kbyte and operating speed of 100,000 operations per second. This system will be further upgraded and improved to make it suitable for application in the sphere of large computer applications.

Basic features of individual types

System	EC 1027-4	EC 1027-8	EC 1027-12
Year for launching of production	1985	1985	1988
Working memory storage capacity (M Byte)	2	2-4	4-16
Speed (K op/s)	350-400	700-800	2,500

b) Minicomputer Systems

These systems will be developed within the SMEP program for the entire area of applications shown in Table 3.

Basic features of individual types

System	SM 4-20	SM 52/11	SM 16/23	SM 52/12
Word length (bits)	16	16	16	32
Year of launching of production	1981	1983	1985	1987
Working memory storage capacity (K Byte)	256	256	1,000	2,000

The systems of microcomputers produced earlier, i.e., ADT and JPR, will constitute a supplemental program for SMEP computers for areas in which those systems already found successful application and for which there is a demand. The reasons here are economic criteria, high value of generated user programs, good efficiency and reliability of these systems. Their production will be discontinued only after it would be of more advantage for the users to make a transition to computers of the SMEP series.

c) Microcomputer Systems

These systems will be developed in an 8-bit form on microprocessor basis (equivalent INTEL 8080) and in 16-bit form on the basis of microprocessor (equivalent INTEL 8086) and further, for higher performance and higher speed applications on the basis of 2- to 4-bit sections (K 1084-equivalent INTEL 3000 and AMD 4000).

Technical Characteristics of Individual Types

Type of system	SM 50/40	SM 50/50	M 16-22	M 16-1
Year of launching production	1982	1983	1985	1986
Working memory storage capacity (M Byte)	0.064	0.256	0.512(2)	1.000
Word length (bit)	8	16	16	16
Number of floating dec. point instructions	-	-	46	-
Type of microprocessor	8080	K 1804	K 1804	8086

Other systems still in production, such as SAPI 80 and SPU 800, will be gradually replaced by prospective SMEP types.

A leeway will be provided in subsequent development of these systems for their complementation by the users themselves. The FMEP sector will provide both hardware and developmental systems for generation of software. Microcomputers will find application primarily in the area of small computer technology, such as personal and instructional computers. A part of their production will be destined for direct building into machines and single-purpose systems.

d) Peripheral Systems

In addition to the types of peripheral equipment already in production, development of their production will be oriented primarily toward:

--a comprehensive external memory program, specifically:
  --large-capacity disks with exchangeable and fixed packets of 100-200 Mbyte capacity and larger,
  --cassette disks of 10 Mbyte capacity,
  --Winchester type disks,
  --small 1/2" magnetic tape memories,
--new input/output systems:
  --floppy disks with bilateral recording and double recording density.

e) Software

The DOS/EC operating system will continue to be developed as part of basic software. A possibility will be provided for the EC 1027 type computers for also using the OS 6 operating system.

Basic software for new types of computers will be provided within the SMEP program.

Functional software for applicational programs will be developed on a substantially larger scale. Here the aspect of type solutions for meeting the needs of users will receive prime consideration.

NOTO Services and Development of the Production Base

Effective application of computer technology is directly dependent on a high level of technical services and servicing. These services, provided in the CSR by Office Machines and in the SSR by Datasystem, still have not attained the requisite level. According to the documents adopted by MVK-VT authorities, the mission of NOTO organizations should be primarily to:

--form an active connecting link between research, development and production and between application of computer technology,
--organize deliveries of hardware and software,
--provide assembly and installation,
--provide maintenance and deliveries of ND,
--perform preventive maintenance and repairs,
--organize software services,
--train cadres and organize consultation services.

Functions of the NOTO organization were stipulated to this extent by CSSR Government Resolution No 340/72 and specified in closer detail by Presidium of the CSSR Government Resolution No 61/77. Despite all efforts and NOTO organization proposals, this resolution has not been adequately implemented (plan of operations and investments) and the status quo can be characterized as follows:

--conditions for providing services have not been created for NOTO organizations,
--the same applies to providing services for minicomputers of the SMEP series,
--provisions for personnel, material and spatial accommodations of training centers are inadequate,
--there is inadequate coverage for capital investments and investments for machinery and systems not included in the budget.

Creation of material prerequisites for the activity of NOTO organizations in centralized forms of hardware and software services makes it possible to achieve substantial savings which can be characterized as follows:

--societal saving of approximately 2,000 personnel over 5 years,
--savings of approximately 1,000 programmers on users' part,
--savings of approximately Kcs 650 million in ND stockpiles,
--improved effectiveness of computer applications.

For the preceding serious reasons the new concept for the development of computer technology includes measures for achieving a decisive turnover in improving NOTO services in the CSSR, particularly by:

--concentrating the servicing activities of NOTO through gradual reductions in the number of servicing technicians and users in favor centralized servicing,

--devising an experiment in Office Machines to verify new forms of providing servicing,
--providing investments for preparation and tuning of programs, training and operation of a NOTO programs library,
--providing of investments for technological equipment and measuring instruments,
--resolving problems in services attendant to sales of programs.

Development of Production Base

Investment development of the production base for computer technology in the ZAVT plants in the Seventh 5-Year Plan emphasizes machinery and equipment not included in the budget and the relevant sublimit construction projects. The key task is modernization of the machinery on hand and the rationalization and modernization project (RaM).

Increases in planned production will be met primarily by these projects. Investment development in the Eighth and Ninth 5-Year Plan will be oriented primarily toward renovation and modernization of the Zbrojovka Brno, Aritma Prague and ZVT Banska Bystrica concern enterprises. No substantial increases in manpower are envisioned for the development of the production base in the Eighth 5-Year Plan.

Results of Key Measures for Implementation of the Computer Technology Concept

After adoption and approval of the devised concept for the development of computer technology, relevant measures will be devised at all levels and the following results can be expected in their wake:

--the JSEP program will become oriented toward the EC 1027-4 and EC 1027-8 modular systems with higher performance and suitable for higher management systems;

--development and production of SMEP minicomputers will be reinforced to achieve a 50-percent production volume of computer technology in use by the target year 1990;

--there will come gradual introduction of the production of new microcomputers, particularly for building them into machinery and systems;

--production of other types of minicomputers (ADT and JPR) will suitably supplement the SMEP series in cases involving goal-oriented types, less expensive designs and innovations called for by the needs of users;

--production of large-capacity disk memories with 100 Mbyte capacity will be lanuched as of 1984 and, later, 200 Mbyte memories in Aritma Prague;

--production of floppy disk units with bilateral recording will be expanded, particularly for exports;

--production of a small magnetic 1/2" (tape) memory was launched in 1983 in ZPA Presov;

--the NOTO organizations will gradually improve and expand servicing to all computers on the basis of industrially provided servicing and substantially reinforce the generation of applicational software while providing for nationwide coordination of software;

--preparations are made in connection with the reductions in prices of electronic parts and increases in the productivity of labor to reduce the prices of CSSR computers as of 1 January 1984 and again as of 1 January 1986;

--the share of peripheral systems production will be increased so as to make complementation of computer configurations possible as early as the Seventh 5-Year Plan;

--improved performance of JSEP and SMEP computers and lowering of their prices will reduce the demands on investments for equipping enterprises with computer technology;

--utilization of computers will be made more intensive by generation of computer networks, communication equipment for computers and their hierarchical arrangement;

--conditions will be created for mutual interlinkage of the entire system of the national economy from ASRP via ASRTP up to top management, including linkage to the automation system.

Conclusion

The preceding facts make it obvious that the key objective of the new concept for the development of computer technology is the discontinuation of the current adverse trends in its development and the generation of conditions for its continued development on the basis of JSEP and SMEP systems.

This objective is well served by the adopted measures in the program of research, development, production and, primarily, services for users.

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Robotron EC 1055 Computers

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 93-94

[Article by -Jk-: "First Seminar of Robotron EC 1055 Users"]

[Text] The tradition of meetings of Robotron computer users that originated through nine EC 1040 seminars goes on. The production of the EC 1040 computer ceased more than 2 years ago. Now the users' concerns are being concentrated on the EC 1055 computers. The new seminar--which took place on 22-24 November 1983 at Strbske Pleso--was therefore designated as the First EC 1055 Seminar. Its staging organizations were Datasystem Bratislava and Office Machines Prague, with Robotron participation. Its more than 120 attendants were informed of new products that are in preparation. User contributions to the discussions concentrated primarily on the problems of computer applications and, further, on problems encountered with the large-capacity EC 5067-02 disk memories which still fail to function satisfactorily, while 15 sets of them were imported into the CSSR for Robotron computers.

From among the individual interesting presentations we offer:

Dr. K. Hellmuth (Robotron Anlagenbau) briefly summarized the development of computer technology deliveries to the CSSR in 1983. He pointed out in particular that in the area of large-capacity disk memories there was no other choice than the one offered to users. The following technology from the sphere of hardware will be available in 1984:

--magnetic tape systems with recording density of 1,600 bpi, namely the EC 5552-02 controller (USSR) and EC 5202-03 magnetic tape units (GDR, Zeiss Jena), as of the third quarter of 1984;
--EC 6019 punch card reader (USSR);
--EC 8371-01 multiplex for remote data transmission (Poland).

K. Maschke (Robotron Anlagenbau) reported on Robotron's warranty services and servicing. He pointed out that the defects which caused frequent breakdowns of STE 2001 and 2003 plates in the EC 1055 or 1055 M computers had been eliminated. He also pointed out some details about the reliability of installed EC 1055 computers and their peripheries while, in his opinion, requisite data about the large-capacity EC 5067-02 disk memories were not yet available. An outline of reliability parameters for the period January-March 1983 is shown in the table below.

System or periphery	Producing country	MTBF	Operat. Availabil.
EC 1055 – systém	NDR	251,8	99,1
EC 2655	NDR	330,0	99,2
EC 7069	NDR	648,9	97,6
EC 5017	NDR	1805,0	97,1
EC 5517	SSSR	7150,4	99,9
EC 5061	BLR	1004,7	95,6
EC 556[illegible]	BLR	6008,0	99,9
EC 601[illegible]	ČSSR	712,6	93,9
EC 60[illegible]	ČSSR	1029,9	90,0
EC 70[illegible]	ČSSR	2629,0	88,9

S. W. Schulz familiarized the attendants with the tasks of the installation center (Montagestuetzpunkt MSP) in Prague during performance of warranty services and servicing. The key ideas of his report that ought to be pointed out are:

--proposed establishment of central storage of replacements parts for the EC 1055 computer from users' resources;

--classification of breakdowns:
a) complete breakdown--the computer cannot be operated at all;
b) system malfunction, i.e., failure of a system--computer operation is limited, some peripheries are inoperable;
c) device failure--breakdown of individual devices (peripheries).

The discussion on the offered presentations was joined in by representatives of the VOKD [Development of Ostrava-Karvinna Mines] Ostrava, State Savings Bank Prague, Skoda Plzen and Technomat. The consensus of all contributions to the discussion was that while the central units are indeed highly reliable, the systems do not perform their functions as a whole, particularly due to serious defects encountered in the EC 5067-02 large-capacity disks, e.g., in the controller (plate STE 5567-13), and frequent blocking of the entire system (DM gesperrt). According to Robotron, that defect was to be eliminated in 1983.

D. Schier dealt with problems of the EC 1055 operating system and its development. He pointed out first of all that a new modification of the OS 6.1M9 operating system will be made gradually available as of the fourth quarter of 1983, and should become available in the CSSR in 1984. It is envisioned to equip it with some new peripheries, e.g., the EC 7040 high-speed printer.

The relevant version of TSO (TSO/SVS 1.1) will become available as of June 1984 for the SVS operating mode.

The state of the operating system for 6.1.M9 is described in the handbook C 583-0061-9 Stand des Betriebsystem OS/EC.

He also pointed out that the M9 modification completes the development of the OS 6 operating system. A new system, designated as OS 7, is in preparation for 1985 and subsequent years.

In view of the fact that his presentation included some interesting details, it will be published in one of the subsequent issues of VYBER.

E. Rudolphova dealt with the problem-oriented software for the EC 1055 and EC 1055/M. The DAKS problem-oriented dialog programming system suitable for terminals of the 7920 series in both local and remote mode deserves particular attention. An abstract form this presentation will also be published in VYBER.

The seminar was concluded and appraised by the deputy business manager of Office Machines, Comrade Eng Michl.

Automation in USSR

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 102

[Article by A. Halek: "Automation of Rolling Mill Train by M-7000 and SM-2 Minicomputers"]

[Text] These minicomputers have made it possible to automate fully the all-purpose rolling mill train in the V. I. Lenin metallurgical combine in Nizhnetagilsk. The ASRTP [computerized control of technological processes] project started to be implemented in 1977 and the precision attained in the rolling of shaped steel girders is on the order of ± 0.05 mm even at rolling speeds of 10.5 m/s. A total of 240 programs are in use. The control process has three hierarchical levels. The sensors of the position of rolled sections, numbering 13 units, automatically control the maximum capacity of the mill train, which is also equipped with three heating furnaces. The annual production of the mill train is 1.4 million tons, representing the highest capacity worldwide. The process of rolling shaped sections is controlled along the train by 450 sensors of primary information about heat, pressure, velocity, etc. Transition to manual control of rolling decreases productivity by 20 to 25 percent with simultaneous loss of the precision of rolling. The annual economic results achieved through introduction of ASRTP brings about a profit of R 2.8 million and the return on investment is 1.7 years. A model of this modernization was demonstrated in 1983 in Moscow at the international exposition Automation 83 in the area of "Automation in Ferrous Metallurgy."

KDP 723 Memory

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 103-104

[Article by -sk-: "New KDP 723 Cassette Disk Memory"]

[Text] Attention was attracted at last years' International Brno Fair MVB 83 by a new product of the Zbrojovka concern enterprise in Brno, the KDP 723 (or KDP 723.1) cassette disk memory. It involves an innovated type of the preceding 721 series, intended for application as external memory for SMEP control and computer systems, but also for ADT 4500, KA 10 and others, even older types of console-type computers. In comparison to the preceding type it is characterized by double the memory capacity (5 MB as compared to the original 2.5 MB).

Some of its characteristics follow: it uses a (lateral) front-loading cassette which meets ISO TC 97SC 10 NO 109. The distribution of data on each surface of the disks is divided into 200 + 4 tracks and randomly selectable sectors

(8, 12, 16, 24 or 32). The number of sectors of the fixed disk and cassette, supplied as part of accessories, is specified by the user, heads of the exchangeable disk can also be adjusted to warrant compatibility with the same type of memory.

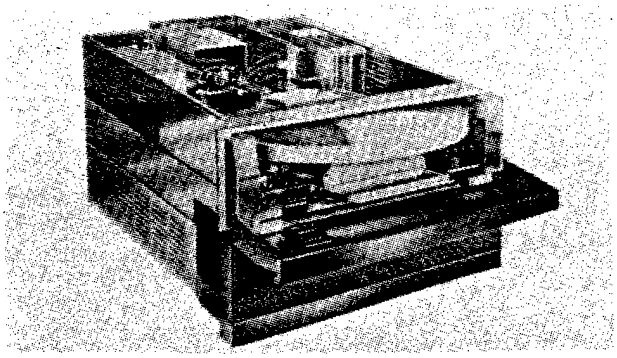
The structural design of KDP 723 is formed by some exchangeable units:

--electronic plates,
--read/record heads,
--work head,
--drive,
--pausing mechanism,
--filtered ventilation,
--built-in power source.

They are suspended on a base plate with electronic frame and basic cabling. The KDP 723.1 type is supplemented by a 750 mm high ventilated casing meeting ISO recommendations.

Technical specifications:

rated capacity (nonformat)	50 Mbit	
format capacity	5 Mbyte	
information transmission speed	2.5 Mbit/s	
longitudinal recording density	87 bit/mm	
disk step	0.254 mm	
number of work surfaces	4	
number of tracks	200 + 4	
number of sectors	12 (8, 16, 24, 32)	
disk revolutions	2,400 rpm	
pausing times:		
minimal (via 1 track)	up to 10 ms	
median	up to 40 ms	
starting time	up to 30 s	
lag time	up to 25 s	
display error rate	max. one error per 5.10^5 displays	
reading error rate	max. one erroneously transferred bit per 10^{10} transferred bits excluding errors of the medium	
power input - KDP 723	430 W	
KDP 723.1	480 W	
consumption during start-up (max. 20 S)	up to 9 A	
radio interference stage	RO2 acc. to CSN 34 2860	
dimensions	KDP 723	KDP 723.1
width (mm)	433	600
height (mm)	310 (7 U)	750
depth (mm)	710	800
weight [kg]	79	128
price (thousands of Kcs)	113	120



Servicing and marketing organizations are Office Machines Prague and Datasystem Bratislava.

Not even the above-described type of cassette disk memory is the last in the series. The producer envisions future innovation (type 724) which should be characterized, among other things, by top-loading of disks, making it compatible with Bulgarian disks.

Floppy Disk Memories

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 105

[Review by Ka: "New Standard for Floppy Disk Memories?" from FUNKSCHAU No 7, 1983]

[Text] Producers of computer technology have recently been endeavoring to introduce a new standard for introduction of a new type of floppy disk memory of 3-inch (approximately 76 mm) diameter. Two sizes of floppy disks have been accepted as standard up to now: 8-inch (203 mm) and 5¼-inch (133 mm) diameter. Of course, the capacities of these larger floppy disks are too great for office and administrative applications that have been undergoing tempestuous development over the past several years, just as the dimensions of playback units for mobile units are too big.

The Japanese Sony company therefore developed a disk system for disk diameters of 3.5 inches (90 mm), designating it Micro Floppy. In May of 1982 19 producers of these memories established a standardization committee (Micro Floppy Standard Committee) which was to help promote the introduction of the new microplate. The Shugart company joined the proposal and introduced on the market a disk unit for these microdisks with a capacity of 500 KB. The latter unit takes up only one-fourth of the volume taken up by a minidisk unit. On the Micro Floppy disk there are 53 tracks per centimeter, access time is given as 6 ms. The microdisk unit is compatible with a minidisk unit.

The trio of producers Matsushita, Hitachi and Maxell have combined, on the other hand, 14 additional enterprises into a group promoting compact disk units. These units, with disks of 3 inch (76 mm) diameter, were demonstrated in late 1981. The disk has a 500 KB capacity, track density is 40 cm. These units too are compatible with units for 133 mm diameter disks. In addition to 11 Japanese producers, three American companies, among them the important producers 3M and Memorex, also opted for these compact disk units. While this duel is not over, it is certain that there will occur a transition to these miniaturized floppy disks, whether 3 or 3.5 inches in diameter.

French Portable Terminals

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 105-106

[Article by -FM-: "Portable MPI Terminals With Infrared Radiation"]

[Text] The use of infrared radiation (IR) for data transmission appears to be suitable in cases where the requisite transmission cabling can be installed only with difficulty or at great expense, particularly in monitoring the progress of production or the flow of materials, in storage management, etc.

Thus, it also appears suitable for the connection of portable terminals. In addition to the already well-known application by Siemens of MOBIDA terminals, in Europe there appeared another producer of programmable portable terminals using data transmission by means of IR, namely the French company MPI. Its system for data acquisition and transmission consists of two basic parts:

a) MPI/102 and MPI/103 portable terminal models--both of these manual models of identical dimensions come in a 15x8x4 cm casing and weigh 350 grams. Input data are entered by keyboard with 20 digital and control keys or a pencil dash-code reader which can use a whole series of various codes (EAN, UPC, 2 of 5, 39, MSI, Monarch, etc.). It uses a single-line 16-digit display for visual entry control. The terminals are fed by common NiCd batteries.

The MPI 102 model can transmit information only to a hierarchically higher computer. Its internal RAM memory has a 4, 8 or 16 KB capacity. Data transmission can progress in one direction, either by means of an acoustic switch or wireless by means of IR over a maximum distance of 15 m to an IR receiver model IR/13 or IR/10. In case of the MPI/103 conversational terminal transmission can occur in both directions. The latter model has a fixed RAM memory of 2, 4 or 8 KB capacity and transmission occurs by means of IR over a maximum distance of 15 m to an IR/13 receiver in both directions.

b) IR 10 and IR/13 infrared receiver models--the IR/10 being the simpler model--are intended only for reception of information by IR from the MPI/102 terminal and its conversion into asynchronous transmission V 24 in heptametric ASCII code at a speed of 4,800 bits/sec. The IR/13 model serves at the same time as a concentrator to which it is possible to connect more terminals and which provides for data transmission in both directions.

It comes equipped with a buffer memory for reception and transmission of messages with a capacity of 4 to 16 KB and three luminous indicators and two digital indicators. It can also control some peripheral devices such as a printer, display screen or even a memory unit with floppy disks. It is equipped with two RS 232 C interface units facilitating data transmission in both directions at speeds of 300 to 19,200 bits/sec. It makes standard use of IBM 2780, 3270 or VIP 7700 routines during transmission.

Depending on the model and the size of RAM memory, the prices of the listed terminals range between Fr 4,200 to Fr 7,500, prices of the receivers-concentrators range between Fr 5,000 to Fr 6,000.

New CSSR Electronic Products

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 107-115

[Article by Miroslav Sigl: "Exposition Electronization and Automation 83"]

[Excerpts] The ongoing tempestuous development of electronics and automation technology--particularly in the last several years following the 15th CPCZ Congress and after establishment of the Federal Ministry of Electrotechnical Industry (FMEP)--has brought about noteworthy results. The latter are appreciated particularly by planners, designers and technologists, developmental, technical and managerial personnel from production and nonproductive branches of the national economy, because approaches to application of electrotechnical and electronic products are wide open. To promote their information and mutual sharing of experience, FMEP and the Central Council of CSVTS [Czechoslovak Scientific and Technological Society] staged a nationwide exposition Electronization and Automation 83. It took place on 21-27 November 1983 on the entire premises of the Congress Palace in the Julius Fucik Park of Culture and Recuperation in Prague.

What made this exposition attractive? The exhibits, in addition to a tremendous assortment of components, elements and assemblies, included finished products, entire systems and demonstrations of applications of machinery and devices, including models. It was possible to test many systems on the spot, others functioned as testing devices and also accommodated the visitors' interests. This time there was an adequate supply of promotional literature, catalogues for serious buyers, some organizations (primarily marketing) organized their market surveys here, operated their test outlets offering some new and attractive products, showed videoprograms, persons manning individual exhibits provided reliable information directly from research, development and production. Fairly detailed information about the exposition was offered by the media, whose representatives were also provided with an adequate amount of information by the exposition's press center, supervised by the press and promotion sector of FMEP. Thus, let us have a look at some of the attractive and new products that could be seen there.

Prospective Series of Electronic Parts

At the present time there are no basic conflicts between the requirements of users and customers and the producer, who is the Tesla Electronic Parts concern in Roznov pod Radhost, as far as the assortment of new parts is concerned. All properly specified demands are met, either by incorporation into a developmental plan or into plans for importation as part of international cooperation. Czechoslovak designers of finished systems have today at their disposal 4,000 types of integrated circuits from domestic production and from development by CEMA countries. Whether it is too little or not is a matter of conjecture. Also available at the exposition was a detailed catalogue "Prospective Series of Electronic Parts," and the exhibits included not only parts produced by conventional bipolar technology, but also those provided by unipolar technology. This involves a set of parts that is adequate for meeting the absolute majority of tasks in the domestic production of final electronic products. The enterprise manager of the Research Institute for Mechanization and Automation (VUMA) in Nove Mesto nad Vah, Eng Frantisek Slanina, had this, among other things, to comment:

"Our spare parts base is already adequate, it is fully satisfactory, there is nothing to be ashamed of. If our technical public made use of it, the level of production could improve substantially...."

The current assortment of digital integrated circuits of low and medium integration can find practical application in any random digital connection. What can be done with these circuits on a printed circuit plate can in many cases be accomplished in an integrated monolithic form--the so-called custom or semicustom integrated circuits. Their use reduces the demand on consumption of materials and energy, is less labor-intensive and solves the problems of economy of serial production. Therefore, to keep the sphere of users informed, another catalogue publications was issued--"Custom Integrated Circuits I L" (Integrated Injection Logic)--conforming with worldwide development wherein newly developed technologies are oriented toward achieving a higher degree of integration, reducing power losses in integrated circuits and improving operating speed.

Sensors, Readers, Controllers

Advances in automation and robotization are unthinkable without suitable devices for the identification of physical magnitudes--sensors and readers. And to provide an effective feedback, there is also need for a requisite assortment of controllers, automatons, integrated automated systems with applied computer technology. The Tesla Roznov concern contributes through design and production of these products, specifically in cooperation with the Tesla Elstroj fiduciary concern organization.

The exhibits from this production included, among other devices, the 306 KA electronic control flow meter for precise and expedient control of gaseous media, temperature controller for electric resistance applicances of up to

2.2 kW connected into 220 V networks, the TPM 28 spatial humidity and temperature sensor suitable for all air-conditioned workplaces, i.e., also for computer centers, the XJ 4501 contactless switch with optoelectronic coupling and tensometric pressure sensors based on a circular silicon plate--a transometric membrane. The TM 520 sensor is intended for industrial applications.

From among the systems of the same producer, interest was attracted by an automatic system for measuring small dimensions in the micrometer range--the Telemet Automatik (a measuring system with a microscope, recording camera, a monitor and a control microcomputer with the MHB 8080 A microprocessor). Analysis of lengths in fully automatic mode is recurrent, each displayed datum is read eight times and the arithmetic average, rounded to one-tenth of a micrometer, is displayed on the monitor screen directly below the recorded image. The system makes it possible to enhance electronically the edges of measured images and structures, and maximum magnification is 5,000x. The producer is Tesla Piestany.

Another such measuring system is ELMOK for measuring and analyzing electric parameters during interoperational control of semiconductor structures. It was developed in Tesla Roznov from the following subsystems: the MIRA microprocessor system, a measuring unit, an automatic stepping system and peripheral devices for input and output.

Metrological and Laboratory Technology

A considerable share in meeting the tasks in metrological and laboratory technology is contributed by another concern--Tesla Measuring and Laboratory Instruments Brno. It displayed at the exposition the BS 301 electronic measuring scanning microscope (based on its predecessor, the BS 300 type), which makes it possible to place into its chamber larger samples and scan larger areas by means of a new manipulator allowing for substantially greater shifts; the microscope comes equipped with a 360° electronic image rotation. Magnification is up to 5,200,000x with digital magnification display. Its producer is the Tesla Brno concern enterprise.

SDR solar differential regulators are readied for production by the Metra Blansko concern enterprise's plant in Sumperk. They are intended for controlling the operation of a pump in a solar water-heating system.

The Laboratory Instruments Prague concern enterprise exhibited a liquid chromatography set, and also the TZ 4601 twin-line plotter which measures and records electric signals from various sources and sensors, the CI 100 integrator as a special-purpose microcomputer with RAM (2 kbyte) and EPROM (3 kbyte) memory.

The SAPI 1 system for automatic measurement and data acquisition is the smallest member of a large family of SAPI systems and processors for the acquisition and processing of data. Its base is formed by the JPR microcomputer with 24 inputs and 24 outputs. It can control a machine or an instrument and can enhance automation of, e.g., a typewriter or terminal.

In its two-plate version (JPR 1 and alpha-numeric display AND 1) the SAPI 1 system can communicate with the user in BASIC. The addition of a simple ANK 1 keyboard and a television set produces a small personal computer or a system for control of a coordinate boring machine or measuring instruments. Its producer is the Tesla Liberec concern enterprise.

Invasion or Inflation of Small Computers?

The Electronization and Automation 83 exposition provided its visitors with an opportunity to familiarize themselves in detail with the SMEP program. A contribution to that end was also made by a special issue of VYBER with an outline of hardware and software of the System of Small Electronic Computers. Representatives of the developmental department of VUVT Zilina and the production department of ZVT Banska Bystrica as well as from Office Machines and Datasystem demonstrated microcomputer and minicomputer systems, including the requisite peripheral units using new physical principles--particularly in the design of disk and tape memories.

A great many specialists from a wide range of occupations (many of whom were also personnel from editorial offices, publishing houses and printing shops) were virtually elated over the Text 01 SMEP office computer (based on the SM 50/40 microcomputer) designed on the basis of the 8080 microprocessor. Its keyboard resembles that of a conventional typewriter, it has a display unit which displays upper and lower case letters of the Czech and Slovak alphabets, comes equipped with a disk unit with two floppy disks and a printer. Software is formed by the MIKROS operating system. The latter makes it possible to process the most varied texts encountered in office or editorial agenda. In writing the text directly onto the display unit it is possible to insert and erase symbols and words, make corrections, change the text, generate a catalogue, format the filing diskette, it also permits graphical enhancement of text, pagination, paragraphing, line and margin justification, entry of notes, etc. Its printing speed is 80 symbols per second with 3 to 6 copies.

The PDM 85 personal microcomputer with a display unit (usually the small portable PLUTO television set) is by now not just a dream, but a reality. The first 200 units were produced in 1983 in Tesla Piestany. It is a single-plate microcomputer with the MHB 8080 A microprocessor oriented as a graphic microcomputer with a 288x256 point raster. It has a 48 K byte RWM or a 4/8 K byte Rom memory (as needed). Its keyboard has 78 keys and the basic configuration also includes cassette tape recorder. Provisions are made for connection of a printer and other peripheries. Its potential applications also are considerable: in office and production operations, in laboratories, even in households, where it can take care of budgeting and management, assist in teaching of mathematics or descriptive geometry, or can be a means of amusement in the form of the most varied videogames.

From the same enterprise (Tesla Piestany) comes the PMI 80 training microcomputer, of which 3,000 units were produced in 1983. It is intended for the instruction and demonstration of the properties of the 8080 microprocessor system in training its future operators and users. Its basic configuration

is formed by a 145x240 mm bilateral printed circuit plate. The user terminal is formed by an 8-digit display, a keyboard with 25 keys, and a series interface for connection of a cassette tape recorder in the function of a peripheral memory.

Another training computer is the IQ 150 type developed by the school of Electrotechnical Engineering of the Czech Institute of Technology in Prague; its production is provided by the ZPA [Industrial Automation Plants] Novy Bor and is distributed through the Komenium enterprise in Prague primarily to schools. It is intended for teaching the basics of programming and other subjects with the aid of applicational programs and for scientific and technical calculations of medium complexity. The rather small casing contains the basic plate with logic circuits, the power feed part and a functional keyboard. In addition to the integrated 8080 microprocessor, among its key elements is a monitoring EPROM memory and a 16 kB or a 32 kB capacity working RAM memory storage. The keys of the keyboard (of which there are 68) are divided into control, editing and data keys. This computer can again be operated with the aid of a common television set (preferably the PLUTO personal portable television set of Czechoslovak production) and a cassette tape recorder (preferably the K 10 type).

The Svetom TVS 01 terminal computer system (in essence a problem-oriented configuration of the SM 50/40 microcomputer system), intended primarily to meet the needs of production cooperatives, was exhibited by the Svetom production cooperative of Velka Rovna (ZIP code 013 62). Another peraonal computer was developed (so far for the needs of Czechoslovak Television Prague) by the MON Videopress fiduciary organization.

Hundred Selected Top Exhibits of the ZAVT Concern

The Automation and Computer Technology Plants (ZAVT), Prague concern was represented at the exposition by all of its nine concern enterprises, both specialized fiduciary concern organizations Office Machines and Datasystem and three research institutes--VUMS [Research Institute for Mathematical Machines] Prague, VUVT [Computer Technology Research Institute] Zilina and VUAP [Automation Research Institute] Prague. Demonstration from their extensive production included some top analog and digital instrumentation for metrological and control technology, including systems for centralized data acquisition and their analysis with the aid of control computers, further selected electric servomotors (electrodrives) for industrial purposes, pneumatic control elements and machinery controls, also electronic regulators (e.g., the TRS type for control of heat and thermal energy consumption, heat sensors and the Inmat and Intest instruments) and systems for digital program control of machine tools.

A new field incorporated by the ZAVT concern into its production program are industrial robots and manipulators. The PR 16 industrial robot with the RS 1 C control system--produced by ZPA Dukla Presov--was demonstrated at the exposition. The selection of suitable types for production is performed, of course, by the coordination center for robotization, which is VUKOV [Metallurgical Industry Research Institute] Presov.

The extent to which it became possible to master technically and gain proficiency in the production of the wide nomenclature of peripheral systems for computer technology was borne out by other exhibits: photoelectric sensors for perforated tape, graphic output systems and graphic systems controlled by computers, punch-card machines, series and parallel (chain) printers for computers, magnetic cassette disk and tape memories. For example, the exhibited Aritma 2035 perforator console was developed in a very short time on the basis of a request by a foreign customer from a nonsocialist country. It has been successfully tested and is already being delivered--it is used for punching identification cards.

Problem-Oriented Complexes Surrounded by Visitors

In addition to SMEP series computers and information about the new EC 1027 medium computer, including development of a 100 MB and 200 MB large-capacity disk memory, the ZAVT concern introduced in the area of computer technology integrated systems, the so-called POK--problem-oriented complexes. All four of them, operated there by personnel of Office Machines and Datasystem, were virtually besieged every day by visitors and there can be no wonder that the informing and demonstrating technicians worked in the sweat of their brows for a week. That also reflects the extraordinary importance attributed to these systems in our national economy and also in foreign trade, where it is envisioned to export them to socialist countries.

POK for control of agricultural production at the district/enterprise level represents a set of hardware and programs which promotes improved operational readiness and quality of decisionmaking, provides for coordination of all levels of the management process. With its aid it is possible to control enterprise dispatching, transportation, inventories, optimize the application of fertilizer, animal reproduction, herd turnover, biological plant control, production and delivery of eggs, feeding plans, etc.

POK for rational nutrition proved to dozens of visitors tested directly at the exposition the capacity of SMEP hardware and software for finding application in preventive health measures for the populace. The computer demonstrated a diet test based on somatometric measurements in the presence of physicians. The tested visitors were thus provided with a modern method for evaluating their food consumption and nutrition with specific recommendations and proposals for reducing or increasing body weight while computing for them at the same time a diet program for a week or a month.

POK for automated design and construction by means of computer (based on SMEP) and automated technological preparation of production as well as for connection to the sphere of automated production (NC program selected automated systems) will find wide application in our industry, particularly in electronics, electrotechnical engineering, furniture manufacture, ready-made clothing and the footwear industry, as well as in construction and general engineering. This POK was demonstrated by Datasystem. The similar IGS 2 system--interactive graphic station--from R&D of VUMS Prague and its GRAMIS graphic software is produced and supplied by the ZPA Cakovice concern enterprise. It was exhibited in the Office Machines exposition.

POK for control of technological processes, including control of nuclear power plants (exhibited and delivered by the ZPA Supply Enterprise, but its completion was participated in not only by the ZAVT concern organizations, but also by the Metra Blansko of the Tesla Brno concern). It permits control and automation of technological processes on the basis of momentary states acquired by the relevant sensors of physical magnitudes. It also provides for automatic transition to a preselected state in case of breakdowns. This system is already demonstrating its capacity for controlling even very complicated technological complexes at the Melnik III power plant (500 MW).

The computerized hospital management system is a complex similar to the preceding POK. It is modular for all types of hospitals. Programs for the admissions department make it possible to perform a fast preliminary diagnosis for deciding whether to hospitalize or provide ambulatory treatment. Other collected information concentrates and processes all data about the prescribed treatment and therapy administered by nursing personnel. The relevant laboratories are also connected into this system. Applicational programs also provide a computerized system for the ordering and consumption of medicines.

As pointed out at a press conference by the general manager of ZAVT, Eng Vladimir Hojka, deliveries of these problem-oriented complexes constitute an approach to industrial entrepreneurship in our countries as well as on the foreign markets of socialist countries.

New Products from Investment Electronics

These were exhibited at the exposition by the Tesla Investment Electronics Concern Prague, which contributes in a significant measure to the development of other branches and their rapid innovation. In communications technology this involves mainly various types of exchanges, applications and capacities, further transmission technology--an entire complex of systems facilitating the transmission of signals as well as terminal systems--telephone sets, secretarial sets, dispatching systems and others.

The SS 82 secretarial set (Tesla Stropkov) is intended for communication with subscribers on state or branch lines and mutually between subscribers by means of a fully electronic junction box using microelectronic parts. It facilitates the connection of a speakerphone and a tape recorder for recording telephone calls.

The EARB electronic subscriber register was developed jointly by Tesla Karlin and research institutes in the USSR and GDR. It constitutes an electronic subscriber register in asynchronous exchanges using an advanced type of cross-bar switch as their basic element. It performs the functions of working memory for storage of information and the number of the called subscriber and, in addition to other functions, controls the operation of the system's users by supplying them with programs for establishing connection. These registers account for up to 20 percent of the volume of deliveries of investment units to telephone exchanges using the ATSK-U crossbar switches.

The application of electronics makesit possible to achieve in the production of these exchanges considerable savings of silver, copper and alloys, the total weight of the system is lower by 69 percent, the space required for installation is reduced by 71 percent, the system's own energy consumption decreased sevenfold, labor-intensity of production is down by 50 percent, and in operation and maintenance by 70 percent.

The above concern introduced at the exposition color variations of automatic telephone sets of the Ds series to meet the needs of demanding customers. A rotary dial is replaced by a block of push-button pulse or frequency dial that permits dialing of up to 20-digit numbers. The set contains a uniform electroacoustic transducer for both the earphone and the microphone, which includes a circuit for automatic loudness control. The set weighs a mere 0.95 kg, its dimensions are 92x219x190 mm.

Electronization in Consumer Products

Innovation of radio and television sets is oriented toward the application of new principles for the maintenance of signals based on a digital principle of their processing. The Tesla Consumer Electronics Concern Bratislava is preparing for serial production playback systems for digital records, a color television console with electronic control functions and videomagnetoscopes for recording and playback of color images and stereo sound while retaining high fidelity. Prototypes of these products and systems attracted an extraordinary amount of interest at the Electronization and Automation exposition.

Other new products in the area of consumer electronics are the OKU 107 electronic calculator, the Tesla 801 Czechoslovak office calculator, the Kyber 1 polytechnical modular system, the Elka 81 electronic cash register and many others.

Electronization-Related Services

In addition to the services offered by the already generally known Office Machines and Datasystem fiduciary concern organizations, the Tesla Eltos sectoral enterprise has developed in all krajs technical, marketing, consulting and servicing activities through the following specialized plants: Tesla Eltos IMA [Institute for Microelectronic Applications], Tesla Eltos ZAR [Management Automation and Rationalization Plants], Tesla Eltos DIZ [Contracting and Engineering Plant]. They offer programming, applicational development and introduction of microelectronic circuits and systems as well as the requisite software for the systems. The exposition provided for its visitors an opportunity to familiarize themselves with the extensive system of these services, including some devices which form a part of them.

They include the Tesla SAPI sets for automated acquisition of information, more than 1,000 of which have already found application in our national economy. A new product is the TEMS 48 A microcomputer system--an all-purpose laboratory module for single-chip microcomputer applications. It involves a

modular system which makes it possible to solve even complex applicational tasks by a combination of suitable all-purpose modules. Its design is based on the domestic spare parts base and offers invaluable services in work centers that are starting the development of microelectronics. It can even be used as a testing system as well as a programming system with PROM and EPROM memories.

Tesla Eltos DIZ also provides for the importation of integrated circuits, measuring instrumentation and other components from socialist countries. It developed its own testing center for their control. The assortment of imported integrated circuits already includes 165 types of which 14 types are of a high degree of integration. As was stated at the Electronization and Automation 83 exposition, soon the argument that we lack a parts base for solving some given design will lose all validity. This statement was music to the ears of those for whom this exposition was intended in the first place--developmental technicians, planners and designers.

In opening the exposition, Ladislav Gerle, deputy premier of the CSSR Government, pointed out that the nationwide program for electronization of the national economy comprises the key objectives and goals that can be attained in selected areas by the late 1980's. Systematic promotion of electronics will contribute to increasing the volume of industrial production by 10 percent, increasing labor productivity by 25 percent, attaining 15 to 20 percent savings of materials and energy, manpower savings on the order of from 100,000 to 120,000 personnel who can be used in other areas of the economic renewal process. Considerable results will also be attained in agriculture, where the application of electronic optimization control systems can increase the volume of plant and animal production by 7 to 10 percent in 1990.

A contribution to these objectives was also to be made by the Electronization and Automation 83 exposition. CSSR Minister of the Electrotechnical Industry Milan Kubat mentioned in the concluding assessment that there were recurring confrontations between producers of electronic and automation technology and its users and that they were the basic intent for the exposition. What happened surpassed all expectations. The attention devoted to the exposition even by the highest party organizations stands witness to the importance and significance of all the problems attendant to the electronization program. In closing the exposition Minister Kubat also stated that he envisions a similar exposition in the course of 2 to 3 years--it is preliminarily intended to hold it at the occasion of the 17th CPCZ Congress. This is in keeping with the planned rates of production increases in our electrotechnical industry, the production of which will increase from the present Kcs 45 billion to 76 billion in 1990 and to Kcs 140 billion in 1995. The share of electrotechnical engineering in the general engineering production will similarly increase from the present 17.5 percent to 22 percent in 1990 and to 26 percent in 1995.

CSSR Microcomputer-Controlled Systems

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 pp 121-125

[Article by A. Halek: "Systems with Microcomputer Technology at MVB (International Brno Exposition) '83"]

> [Excerpts] It is a matter of general knowledge that microprocessor and microcomputer technology has earned for itself an important position not only in computer technology, but also in many other machines, devices and systems. Let us now have a look at some of these systems that became attractive exhibits at the anniversary 25th Machinery Fair in Brno in 1983.

SPT 16 NC semiautomatic turret lathe (KOVOSVIT Sezimovo Usti). Its slides are controlled by servomotors with spheroidal screws, spindle drive is provided by an electric motor with a thyristor converter. The CNC NS 660 integral numerical electronic control (Tesla Kolin) has its basis in the TESLA MBH 8080 A microprocessor, which together with the memory of the systemic program EPROM 10k x 9 bits, working memory storage RAM 4k x 9 bits and the memory of part-programs RAM 4k x 9 bits forms a problem-oriented microcomputer. A significant feature is the fact that its part-program memory stores data for milling even during network outages, because it is fed by a reserve battery source for at least 150 hours. The microcomputer concept provides for linear and circular interpolation of the lathe's coordinates.

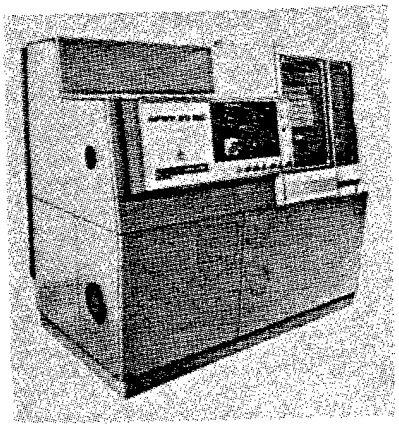


Figure 1. SPRY 25 NC semiautomatic turret lathe

SPRY 25 NC semiautomatic turret lathe (TST-ZPS [Precision Engineering Plants of the General Engineering Plants] Gottwaldov), (Figure 1). Its cross slide has a 12-position revolving turret hydraulically reinforced in operating position. The NS 510 A electronic numerical system (ZPA [Plants of Industrial Automation] Kosire) is based on the 8080 A microprocessor and provides for very simple operation of the machine without preparation of a program away from the machine and without preliminary adjustment of tools. Its part-program memory is protected against network outages for 72 hours. The system includes fixed milling cycles for rough milling and thread cutting.

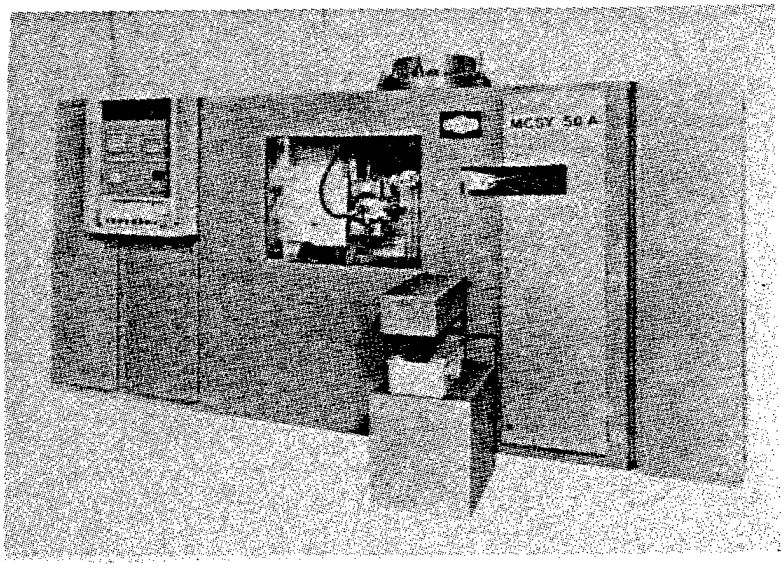


Figure 2. MCSY 50 A multipurpose lathe-type machine tool

MCSY 50 A multipurpose lathe-type machine tool (KOVOSVIT Sezimovo Usti) (Figure 2) is characterized by its entirely new structural design. A new feature also is systematic milling of parts from both sides even in small-series engineering production, a result of cooperation with the Scientific Production Association of Machine Tool Producers in Leningrad. The continuous microcomputer NS 581 electronic CNC system (Tesla Kilin) automates milling operations in five coordinates and provides for simultaneous linear and circular interpolation along three axes. Of importance is the fact that the system permits software programming of terminal positions for all milling axes, thus delineating the operating space by program. Basic functions are controlled by the NS 915 programmable automatic system (Tesla Kolin) of a contactless logic concept, which also offers diagnostic analysis of possible breakdowns.

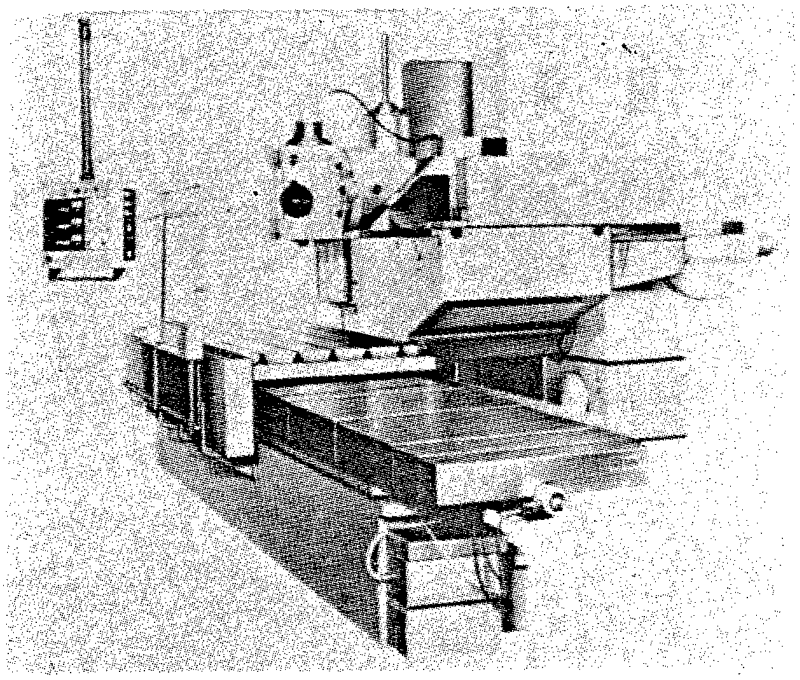


Figure 3. FSS 80 NC bed-type milling machine controlled by the NC 720 system and the ADT 4430 unit

The FSS 80 NC bed-type milling machine (TOS [Machine Tool Plants] Kurim) (Figure 3) is of an entirely new structural design. On the sliding milling head is a two-spindle revolving turret head with a horizontal and vertical spindle with automatic positioning for operation. It comes equipped with the NS 720 integrated numerical control system (ZPA Kosire) of the CNC type with a central processor unit of the ADT 4430 minicomputer, which can be replaced by a microcomputer processor.

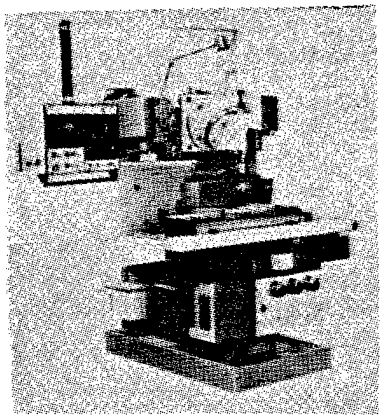


Figure 4. FGS 32 console-type traversing head milling machine

The FGS 32 console-type traversing head milling machine (TOS Kurim, plant in Lipniknad Becva) (Figure 4) represents the smallest type designed for the production of small precision parts of complicated configuration. It comes equipped with the three-coordinate CNC NS 633 A microcomputer control systems (ZPA Kosire) with the 8080 A microprocessor. It facilitates milling in rectangular cycles.

MCSK 8 NC vertical lathe-type machine tool for rotary parts (TST-TOS Hulin) is equipped for automatic exchange of rotary tools. Its integral NS 560 three-coordinate CNC system with the built-in 8080 A microprocessor is protected against network outages for at least 150 hours.

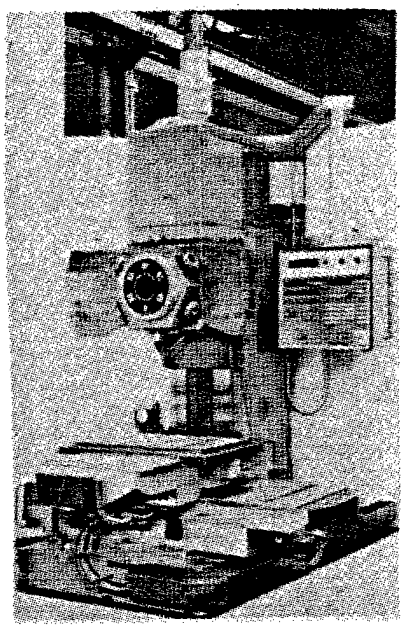


Figure 5. VXR 50 NC A coordinate boring machine

The VXR 50 NC A coordinate boring machine (KOVOSVIT, plant in Holoubkov) (Figure 5) has a 6-spindle tool head. Path measurement is done from spherical screws by means of photoelectric pulse sensors. Its 3-coordinate NS 632 A microcomputer control rectangular CNC numerical system (ZPA Kosire) makes it possible to generate a program directly on the boring machine during production of the first workpiece. The microcomputer contains the 8080 A microcomputer and has a built-in programmable automatic device which simplifies the operation of the machine and speeds up programming.

In individual VHJ's [economic production units] exhibits introduced machines using microcomputer technology, particularly:

SABINA electronically controlled single-cylinder automatic hosiery knitting machine (ELITEX Liberec). Its built-in microprocessor controls knitting size

adjustment, continuous density, changes in machine revolutions, lubrication and restarting, counting of good weaves, signals the type of machine breakdown (by specifying the step in which the breakdown occurred), etc.

EDIS electronically controlled single-cylinder four-system automatic hosiery knitting machine (ELITEX Liberec) is the world's first machine comprehensively controlled by a microcomputer. It is designed primarily for knitting fine pantyhose, hosiery and knee-high stockings.

The microcomputer controlled water treatment plant (SIGMA Hranice) is comprehensively automated and operates on the principle of two-stage water treatment. All information from the technological process of water treatment is collected by the microcomputer, which analyzes it and then controls individual water treatment operations in real time. The microcomputer also precisely pinpoints and signalizes any possible breakdowns and, depending on their nature, either continues in emergency operation mode or automatically cuts off operation.

PPC 4 polyprocessor system for control and automation of technological processes (CKD Semiconductors Prague). It is characterized by its high share of microcomputer hardware, containing a central processor and three additional processors: logic, display and input/output. It is of modular concept and is intended mainly for control and comprehensive automation of high-speed technological processes in real time. Peripheral units provided with transmission of information can be at a distance of 500 m and, in special cases, up to 2 km. It finds application in ASRTP of compressor stations of transit gas pipelines, rolling mill trains, blast furnaces, etc.

BS 600 electron lithographic machine (Tesla Brno). It finds application in the production of microelectronic circuits of the VLSI type. Deflection of its electron beam of variable diameter is provided by a system with a vector magnetic field. Six built-in microcomputers provided for automated progress of production without operators and continuously deal with all operational states, diagnosing and recording breakdowns, informing about the progress of the production process. Together with power feed and control circuits it forms an independent unit that can be connected to a data system with the objective of providing customer data, e.g., chip size, chip distribution on the substrate, and information about the geometry of an exposed stencil.

MIKROMODUS BM 530 modular microprocessor system (Tesla Brno). It makes it possible to devise various measuring and other systems. Microprocessor configurations with 8080 A can be used for the simplest and higher levels of automation of measurements. Interface with external media is provided by the IEC 625.1-IMS 2 busbar.

The BM 576 programmable generator (Tesla Brno) generates hf signals of precise frequency, defined level and adjustable AM or FM modulation. Its built-in microprocessor unit automates operation, diagnoses interferences and provides for recording of output data.

The MIT counting-type digital voltmeter (METRA Blansko) is controlled by the 8080 a microprocessor. It is noted for its long-term operational reliability and precision of measurements.

The ELECTRONIC 100 dispatching system (Tesla Holesovice) is automated by 8080 A microprocessors. It does not contain any relay units, which often tend to break down.

This outline lists only a limited number of machines and systems using microcomputer technology. Some additional similar exhibits, particularly metrological, also contained built-in microcomputer circuits and blocks, something that is by now taken for granted and does not need to be pointed out.

CSSR Moscow Trade Center

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1, 1984 p 139

[Article by Eng Flidr: "New Technical Trade Center in the USSR"]

[Text] A new CSSR technical trade center was opened in November of last year in the Chertanovo section of Moscow. It originated through the cooperation of Czechoslovak and Soviet architects and builders on the basis of an intergovernmental agreement. The center's basic mission is to organize theoretical and practical instruction and training of Soviet specialists who work with machines and systems of CSSR production, familiarize the technical public with the level of and new developments in our production. The center is equipped with classrooms for 30 to 100 students, a movie theater accommodating 500 viewers and including an interpretation system, a restaurant and housing for 80 to 100 persons. An 1,800 m covered exposition area is being readied for exhibits and demonstrations (of which 1,230 m are for heavy exhibits) and 3,750 m^2 of concrete paved open space. In addition to the preceding facilities, the center provides users with laboratories, workshops, storage areas, garages and the requisite mechanized equipment.

The first comprehensive sectoral exposition is under preparation in the new technical trade center on the basis of an agreement between OBO in Moscow and FMEP [CSSR Federal Ministry of Electrotechnical Industry]. The exposition, whose specialized orientation is characterized by its designation ELECTROEXPO CSSR-84-Moscow, will be held between 23 May and 5 June 1984. The objective of the exposition is to show the possibilities for continued promotion and development of scientific, technical and economic cooperation between FMEP organizations and Soviet partner ministries. The ZAVT [Plants of Automation and Computer Technology] will prominently participate in the exposition in the form of exhibits from the area of computer, control and automation technology.

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